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MALNUTRITION AND MENTAL RETARDATION: AN ANNOTATED BIBLIOGRAPHY

Lemar J. Clevenger, L. Marlyn Drossman,
Carolyn Shaffer, and Janet Wyatt*

Malnutrition is a condition which results from unremitting inadequate nourishment. The malady can exist in anyone; however, it is especially devastating to the developing fetus and infant, for the effects on mental development can be extensive, irreversible, and result in mental retardation. The extent of the problem staggers the imagination, when one considers the amount of poverty, hunger, and starvation in the world. The economic loss, alone, to the individual, the family, and the country is almost incalculable.

On the surface, treatment would appear to be quite simple--provide adequate food; however, that solution is complicated by many intertwinning variables--illiteracy, low income, substandard living conditions, infection, improper or inadequate methods of maternal and infant care, and age. In addition, these conditions tend to be cyclic.

Presently, effective programing is sparse. The institution of preventive measures will be an Herculean task. Also the establishment of guidelines and the determination of priorities will be difficult. The programs should be comprehensive, international in scope, and coordinated at all levels.

This bibliography covers the literature published since 1959 and is limited to documents concerned with generalized undernourishment and its relationship to mental development. Documents relating to specific dietary deficiencies (as vitamin deficiencies), metabolism problems, localized famine (as in Biafra), and physical growth--except as it relates to brain growth--are not included.

GENERAL

CHANDRA, R.K. Nutrition and brain development. *Journal of Tropical Pediatrics*, 10:37-38, 1964.

Although studies indicate that gross undernutrition during infancy can have detrimental effects on mental development, more research in this area is needed.

CRAVIOTO, JOAQUIN, & DE LICARDIE, E.R. Intersensory development of school age children. In: Scrimshaw, Nevin, & Gordon, John E., eds. *Malnutrition, Learning and Behavior.* Cambridge, Massachusetts, MIT Press, 1968, p. 252.

Three factors should be considered in the study of malnutrition and its effect on the mental development of children: the quality and quantity of food the child eats; the disease conditions prevalent in the child's environment; and the social condition of parents and children.

CRIM, SARAH R. Nutritional problems of the poor. *Nursing Outlook*, 17(9):65-67, 1969.

Nutrition, poverty, and disease are all parts of a vicious cycle; malnourished people become ill easier and more often, have less money to pay doctors or buy food and without outside intervention have no chance of breaking the cycle. The cost to feed adequately the needy of the United States would be 1 and 1/2 billion to 2 billion dollars more than the current estimate; however there are no accurate estimates of what the ultimate cost would be not to provide everyone with an adequate diet.

DEAN, R.F.A. Kwashiorkor. *Recent Advances in Pediatrics.* Boston, Massachusetts, Little, Brown, and Company, 1965.

Kwashiorkor, its etiology, physiology, treatment, and ultimate prognosis for mental development is discussed.

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*Sincere appreciation is expressed to Miss Cathy Hiser for her aid in preparation of this bibliography.

GIROUND, A. Nutrition of the embryo. *Federation Proceedings*, 27(1):163-184, 1968.

Aspects of embryonic nutrition including nutrient deficiencies, excesses, the role of genetics, the importance of the placenta, and disorders associated with malnutrition are discussed.

HENDRICKSE, R.G. Interactions of nutrition and infection: Experience in Nigeria. In: Wolstenholme, G.E.W., & O'Connor, Maeve, eds. *Nutrition and Infection* (Ciba Foundation Group Number 31), Boston, Massachusetts, Little, Brown, and Company, 1967, p. 98-111.

Interactions between nutrition and infection are reviewed with special reference to the effect of severe malnutrition and/or protein deficiency on host susceptibility to bacterial infections, measles, and malaria. Analysis of 1,685 consecutive deaths in children demonstrates that in developing countries, the high mortality rates found in children under 5 years of age are due in large part to the interaction between infection and malnutrition.

HURLEY, LUCILE S. Approaches to the study of nutrition in mammalian development. *Federation Proceedings*, 27(1):193-198, 1968.

Approaches which can be utilized to study nutrition and malnutrition in mammalian development include manipulation of maternal diet, maternal biochemical analysis and examination, embryonic and neonatal diet manipulation, and embryonic and neonate biochemical examination.

KING, CHARLES GLEN. Frontiers in nutrition: Research, education, and action. *Journal of the American Dietetic Association*, 53(3):222-225, 1968.

Nutrition is discussed in an overview in terms of information growth rate in the field of nutrition, the effects of infant and post-weaning malnutrition, retardation and protein deficiency, malnutrition of deficiency and excess nutrients, and world health.

LELAND, H. The relationship between intelligence and mental retardation. *American Journal of Mental Deficiency*, 73(4):533-635, 1969.

The biomedical questions which arise from malnutrition and other factors which lead to deficiencies in RNA and retarded enzymatic action during the developmental period are as important as those posed by inborn errors of metabolism, infection, or other factors. The cultural and biomedical defects of the developmental period could be dealt with fairly well if the nutritional and allied states of parents could be assured at the time of conception; appropriate nutrition, disease protection, and other protective measures could be insured throughout gestation; and the proper elements after birth could be guaranteed.

MAEGRAITH, B.G. Interaction of nutrition and infection. In: Wolstenholme, G.E.W., & O'Connor, Maeve, eds. *Nutrition and Infection* (Ciba Foundation Study Group Number 31), Boston, Massachusetts, Little, Brown, and Company, 1967, p. 41-55; discussion 56-58.

Studies of the interaction of nutrition and infection are discussed in regard to: malaria and other parasites and host diet; infection and intestinal absorption of foodstuffs; absorption curves and *Plasmodium knowlesi* and *Ancylostoma caninum* infections; and adrenergic blockage and absorption in animals.

MATA, L.J., URRUTIA, J.J., & GARCIA, BERTHA. Effect of infection and diet on child growth: Experience in a Guatemalan village. In: Wolstenholme, G.E.W., & O'Connor, Maeve, eds. *Nutrition and Infection* (Ciba Foundation Study Group Number 31), Boston, Massachusetts, Little, Brown, and Company, 1967, p. 112-126; discussion 126-134.

Inadequate diets, infections, and infectious diseases appeared to affect health and growth during the first few months of life in children studied from birth to 2 years in a primitive agricultural Guatemalan village, lacking in sufficient hygienic facilities.

McCANCE, R.A. Food, growth, and time. *Lancet*, 2(7257):621, 671, 1962.

A general discussion of nutrition, development, and life expectancy is given. Aspects considered include: development *in utero*, food of the fetus, maturity and size, food-supply of the newborn, development after birth, and nutrition and life expectancy.

McCANCE, R.A., & WIDDOWSON, E.M., eds. *Calories and Protein Deficiencies*. Cambridge, England, Cambridge University Press, 1968.

The proceedings of a conference on calorie and protein deficiencies is presented with discussions on etiology, clinical aspects, treatment, and prognosis.

RAMOS GALVAN, RAFAEL. Nutricion infantil: II. Crecimiento en la desnutricion (Infant nutrition: II. Growth in malnutrition). *Gaceta Medica de Mexico*, 97(12):1527-1540, 1967.

Socioeconomic, biological, and cultural aspects of malnutrition in Mexico are given and a prognosis of ultimate body weight, height, and degree of MR is presented. The text is illustrated with many graphs and tables.

SCRIMSHAW, NEVIN S., & GORDON, JOHN E., eds. *Malnutrition, Learning, and Behavior.* Cambridge, Massachusetts, MIT Press, 1968.

Discussion of the state of current knowledge concerning malnutrition and mental development was the basis for a conference on malnutrition held at MIT. Thirty-seven countries were represented and included the fields of pediatrics, sociology, genetics. Information from the lab, clinic, and field was reviewed; animal and human studies emphasized the fact that severe malnutrition early in life not only stunts physical growth, but has an irreversible effect on CNS development.

STEVENS, HARVEY A. "...the field is rich...and ready for harvest.... *American Journal of Mental Deficiency*, 70(1):4-15, 1965.

If prenatal and perinatal events occur along a continuum of reproductive casuality, then maternal malnutrition, prematurity, and complications of pregnancy are some of the factors which may play a significant part in the production of cultural-familial MRs. Cultural-familial MR may be due to preventable physical pathology closely related to low cultural-economic status.

WINNICK, M. Brain development during malnutrition. Paper presented to the Seventh Meeting of the PAHO Advisory Committee on Medical Research, June 24-28, 1968, Washington, D. C.

Early malnutrition will be most detrimental to brain development. Even after rehabilitation, a deficit in the cells in all organs exists. Birth to 6 months of life is the critical period in humans in respect to brain cell division. Children who die of malnutrition in infancy, show a marked reduction in the number of cells in brain--in some cases a reduction of over 60% occurs. Adequate feeding post-natally will result in reversal of these effects.

WOLSTENHOLME, G.E.W., & O'CONNOR, MAEVE, eds. *Nutrition and Infection*, (Ciba Foundation Study Group Number 31), Boston, Massachusetts, Little, Brown, and Company, 1967, 144 p.

A series of papers discussing the interactions of malnutrition, infection, and mental and physical development is presented by authorities in the field.

EPIDEMIOLOGY

African tragedy--needless wastage of children's lives. *Nursing Mirror*, 127(16):43-45, 1968.

The high infant and child mortality rates in most African countries are due to poor maternal nutrition, repeated pregnancies, almost continuous breast-feeding, and malnutrition caused by poverty, want, and post-weaning feeding traditions which include diets which are almost entirely lacking in proteins.

AMERICAN ACADEMY OF PEDIATRICS. Malnutrition in the world's children. *Pediatrics*, 43(1):131-133, 1969.

A statement by the Academy expresses the hope that the United States' resources will be directed to eliminating malnutrition in children which by conservative estimates affects 276,000,000 of the world's children.

BAGDIKIAN, BEN H. *In the Midst of Plenty*. Boston, Massachusetts, Beacon Press, 1964, p. 127.

More than 1/5 of Americans are ill-fed, ill-housed, and forgotten--barely managing to survive in the land of honey and milk.

BERG, ALAN D. Malnutrition and national development. *Foreign Affairs*, 46(1):126-136, 1967.

Evidence suggesting that malnutrition and mild MR are linked should be cause for concern in world capitals. Basic beliefs that all normal infants can grow up to be bright and productive does not follow. Malnourished children grow up and remain permanently dull; the implications are obvious when the fact that 2/3 of the children of developing countries are now suffering from some degree of malnutrition. This basic fact needs to be taken into consideration when theories of national development and international policies towards underdeveloped nations are discussed.

CITIZEN'S BOARD OF INQUIRY INTO HUNGER AND MALNUTRITION IN THE UNITED STATES. *Hunger, U.S.A.:A Report.* Washington, D. C., New Community Press, 1968.

A report by leading citizens suggests that malnutrition associated with poverty or illness has an effect in retarding mental development. At least 256 counties in the United States have children with retarded growth and probable damage to mental capacities.

COURSIN, DAVID BAIRD. Undernutrition and brain function. *Borden's Review of Nutrition Research*, 26(1):1-13, 1965.

It is estimated that 70% of all preschool children in developing countries suffer from undernutrition; some estimates run as high as 100%. If, as seems probable from present research, undernutrition can reduce mental capacity from 10% to 20%, then prevention of undernutrition could be a critical factor in upgrading these countries to a productive level.

CRAVIOTO, JOAQUIN, BIRCH, H.G., DE LICARDIE, E., ROSALES, L., & VEGA, L. The ecology of growth and development in a Mexican preindustrial community. Report I: Method and findings from birth to one month of age. *Monographs of the Society for Research in Child Development*, 34(5):1-76, 1969.

Newborns were taller and heavier from well-nourished mothers of upper social status families. Infants of well-nourished younger mothers with small families evidenced the most gain in weight and total body length during the first month of life.

GOPALAN, C. Malnutrition in childhood in the tropics. *British Medical Journal*, 4(5579):603-607, 1967.

Malnutrition is the most important cause of ill-health and mortality among children in the tropics; infant and children mortality rates are so high that a child's life expectancy at age 5 is actually higher than at birth. Maternal malnutrition is also prevalent in these countries and is an important factor in infant prematurity and subsequent death. Clinical manifestations and treatment are illustrated by case studies.

Grass Roots. Cleveland, Ohio, Inner City Protestant Parish, 1967.

Intensive medical examinations of 932 Cleveland children, most of whom were Negro and from families on public welfare, revealed that 111 were seriously underweight; 587 needed dental referrals; 150 had serious, but correctable hearing or vision problems; and 26 had severe neurological or endocrinological abnormalities.

GYORGY, PAUL. Protein-calorie and vitamin A malnutrition in Southeast Asia. *Federation Proceedings*, 27(3):949-953, 1968.

Children in Indonesia and Thailand identified as malnourished and clinically vitamin-A deficient in 1957-1959, when reinvestigated in 1963-1964 had a significantly lower IQ than a control group which was not considered malnourished. Comparison on Iowa standard growth curves for height and weight showed the fiftieth percentile of Asian children to be significantly lower than the third percentile of American children.

HEDAYAT, HABIB, GHARIB, MOHAMMAD, & SADRE, MAHIN. Protein-calorie malnutrition in hospitalized Iranian children. *Journal of Tropical Pediatrics*, 14(3):124-131, 1968.

Malnutrition is the diagnosis in 31% of children admitted to Teheran hospitals in 1966. Marasmus accounts for twice as many cases as kwashiorkor and mortality is more common in marasmus. In infants, 45% of the hospital cases are malnutrition victims, illustrating the fact that infants are more susceptible to malnutrition.

HOOTMAN, ROSALIE HAEDER, HASCHKE, MARILYN B., RODERUCK, CHARLOTTE, & EPPRIGHT, ERCEL S. Diet practices and physical development of Iowa children from low-income families. *Journal of Home Economics*, 59(January):41-44, 1967.

A study of 50 children from low-income families concluded that about 1/2 had "excellent" diets; ascorbic acid, calcium, and iron were the predominantly inadequate nutrients in "poor" diets; and no correlation between poor diets and low-income families could be established.

JELLIFFE, DERRICK B., & McKIGNEY, JOHN I. The Caribbean Food and Nutrition Institute. *Clinical Pediatrics*, 8(2):98-105, 1969.

The steady population growth in the 15 English-speaking countries of the Caribbean and the insufficient supplies of foods have resulted in severe forms of protein-calorie malnutrition, diarrheal disease, and dental caries. The Caribbean Food and Nutrition Institute provides technical coordination, advisory services, field investigations, and training for interdisciplinary activities and programs directed toward the development of solutions to the food and nutrition problems of this area.

Malnutrition widespread: Average figures misleading. *Times Educational Supplement*, 2696(January 20):173, 1967.

It is suggested that malnutrition in children in British communities is much more prevalent than official reports indicate.

MYERS, MADGE L., MABEL, JUDITH A., & STARE, FREDERICK J. A nutrition study of school children in a depressed urban district. *Journal of the American Dietetic Association*, 53(3):234-242, 1968.

A nutritional status survey of 322 children in a deprived section of Boston, and clinical, anthropometric, dental, biochemical, and dietary studies are presented.

PICO, RIGOBERTO AGUILAR. Nutricion infantil: Introduccion (Infant nutrition: Introduction). *Gaceta Medica de Mexico*, 97(12):1517-1527, 1967.

A discussion of malnutrition as exists in Mexico is given with case histories and pictorial illustrations.

Race to save children retarded by starvation. *Children Limited*, 18(4):1, 1969.

A study of 150 selected children from homes in South Memphis, Tennessee revealed that 40% had irreversible mental and physical damage, most of which was due to inadequate diet during the first year of life. The blood protein levels of many of these children were lower than those of children who have had leukemia for 2 years. Prevention programs in this area include the distribution of surplus food to 6,000 families and the provision of nutrition and hygiene education for mothers, parent education, and transportation to the hospital.

SALOMON, JOAO B., MATA, LEONARDO, J., & GORDON, JOHN E. Malnutrition and the common communicable diseases of childhood in rural Guatemala. *American Journal of Public Health*, 58(3):505-516, 1968.

Field studies demonstrated the synergism which exists between nutritional deficiency and infectious disease in countries with poor economic opportunity, poor environmental sanitation, and poor medical care. Disease superimposed upon inadequate diet had devastating effects and often precipitated severe or fatal kwashiorkor. Malnutrition appears to decrease host resistance to infection which in turn puts greater demands upon the already nutritionally depleted host.

SCRIMSHAW, NEVIN S., & BEHAR, MOISES. Protein malnutrition in young children. *Science*, 133(3470):2039-2046, 1961.

Malnutrition in underdeveloped areas is discussed in relation to infant mortality, morbidity, clinical manifestations, biochemistry, pathology, epidemiology, and treatment.

TEXAS NUTRITION SURVEY TEAM. Nutrition survey in Texas. *Texas Medicine*, 65(3):40-49, 1969.

The provisional results are given on 1,700 Texas families in regard to their nutritional status. The information is based on hand and machine sorts with computer analysis yet to be made.

WATERLOW, J.C., CRAVIOTO, JOAQUIN, & STEPHEN, JOAN M.L. Protein malnutrition in man. *Advances in Protein Chemistry* 15:131-138, 1960.

Clinical, biochemical, and social aspects of protein malnutrition in the human are discussed. Protein malnutrition is a very common disease with a high mortality rate and will become even more widespread unless measures are taken to prevent and control the disorder.

WORLD HEALTH ORGANIZATION. Nutrition in maternal and child health (with special reference to the Western Pacific). Monograph Number 5. *Journal of Tropical Pediatrics*, 14(3):149-195, 1968.

A review on nutritional deficiencies, growth and MR, infant and maternal feeding, and education as they exist in the Western Pacific area is presented.

ETIOLOGY

ADAMS, RICHARD N. Cultural aspects of infant malnutrition and mental development. In: Scrimshaw, Nevin, & Gordon, John E. *Malnutrition, Learning, and Behavior*. Cambridge, Massachusetts, MIT Press, 1968, p. 465-475.

The need for concentrated, long-term group effects to define the relative importance of heredity, malnutrition, infection, social factors, and their interactions is stressed.

ALLEN, GORDON, & KALLMAN, FRANZ. Etiology of mental subnormality in twins. In: Kallman, Franz, ed. *Expanding Goals of Genetics in Psychiatry*, New York, New York, Grune & Stratton, 1962.

Among twins discordant for severe mental defect, birth-weight is etiologically implicated in a majority of monozygotic twins, the low birth-weight twin having been starved intrauterinely.

BABSON, S.G., KANGAS, J., YOUNG, N., & BRAMHALL. J.L. Growth and development of twins of dissimilar size at birth. *Pediatrics*, 33(3):327-333, 1964.

Twenty pairs of dissimilar in size twins were investigated. Significant differences were found between the pair members in height, head circumference, and weight, as well as in intelligence with the smaller twins scoring lower in every respect.

BAZSO, J., LIPAK, J., SOOS, A., MALAN, M., & ZSADANYI, O. The later effects of prenatal malnutrition on the physical and mental development of twins. In: Richards, B. W., ed. *Proceedings of the First Congress of the International Association for the Scientific Study of Mental Deficiency*, held September 12-20, 1967, Montpellier, France. Surrey, England, Michael Jackson Publishing, 1968, p. 404-413.

In a study of 41 twin pairs, it was found that children with a birth-weight below the tenth percentile had a higher incidence of handicaps and MR. Prenatal slow growth and low intelligence both appear to be consequences of prolonged intrauterine nutritional deprivation.

BEHAR, MOISES. Prevalence of malnutrition among preschool children of developing countries. In: Scrimshaw, Nevin, & Gordon, John E., eds. *Malnutrition, Learning, and Behavior*, Cambridge, Massachusetts, MIT Press, 1968, p. 30-42.

The dietary pattern of infants born in a Mayan Indian community demonstrated that the amount of food offered weanling infants was very small and certain high protein items were excluded as they are not considered suitable for infants. At 24 months of age, only about 50% of the accepted caloric allowance and 55% of the required protein allowance was being consumed by these children. By the fourth year of life, the dietary intake had improved considerably; however, 70% of children of lower-income, rural Guatemalans remain 10% or more below expected weight for age.

BULLARD, DEXTER M., JR., GLASER, HELEN H., HEAGARTY, MARGARET C., & PIVCHIK, E.C. Failure to thrive in the "neglected" child. *American Journal of Orthopsychiatry*, 37(4):680-690, 1967.

Children treated for "failure to thrive" are often found to be malnourished and neglected. Sequelae in such children include MR, behavioral disorders, and physical disabilities.

CHURCHILL, JOHN A. The relationship between intelligence and birthweight in twins. *Neurology*, 15(4):341-347, 1965.

The relationship between birth-weight and WISC IQ was investigated in 50 sets of twins. The heavier pair members (those with less intrauterine impoverishment) had higher IQs than the lighter pair members.

COLLIS, W.R.F., & JANES, MARGARET. Multifactorial causation of malnutrition and retarded growth and development. In: Scrimshaw, Nevin, & Gordon, John E., eds. *Malnutrition, Learning, and Behavior*. Cambridge, Massachusetts, MIT Press, 1968, p. 55-71.

Studies in Nigeria support the concept that interactions between malnutrition and infectious disease cause retarded growth and development. Children from a lower socioeconomic background are retarded in weight, height, and general physical development when compared to a control group from a higher socioeconomic level but with the same racial background.

CROME, L.. & STERN, J. *The Pathology of Mental Retardation*. London, England, J. & A. Churchill, 1967, 406 p. $17.50.

Among factors prominent in the etiology of MR are disorders of gestation caused by malnutrition of the mother and malnutrition of the infant and child.

CULLEY, WILLIAM J. Nutrition and mental retardation. In: Carter, Charles H., ed. *Medical Aspects of Mental Retardation*. Springfield, Illinois. Charles C. Thomas, 1965, p. 88-111.

The 2 main categories of the nutritional aspects of MR are nutritional deficiencies that cause MR and nutritional problems associated with MR. The first category includes caloric deficiency, protein deficiency, maternal protein deprivation, vitamin deficiencies, and vitamin excesses. The second category includes problems that are primarily due to motor disturbances in children which lead to difficulty in chewing and swallowing.

HENDEL, GRACE M., BURK, MARGUERITE C., & LUND, LOIS A. Socioeconomic factors influence children's diets. *Journal of Home Economics*, 57(3):205-208, 1965.

A study of different socioeconomic classes of children revealed that amounts and omission of vitamins A and C in diet were related to family income, urbanization, education, and number of children.

HSEUEH, ANDIE M., AGUSTIN, CONRADO E., & CHOW, BACON F. Growth of young rats after differential manipulation of maternal diet. *Journal of Nutrition*, 91(2):195-200, 1967.

Previously reported growth-stunting of progeny of dietary deficient mothers appears to be due to the deficiency of protein in the diet. Both the quality and the quantity of dietary protein during gestation have a great effect on subsequent growth of the offspring. Caloric intake is probably a secondary factor.

JACKSON, R. L. Short comments. In: Scrimshaw, Nevin, & Gordon, John E., eds. *Malnutrition, Learning, and Behavior.* Cambridge, Massachusetts, MIT Press, 1968, p. 303.

It is suggested that the nutritional problems of the child and his mother are not confined to the infancy period. Most women of child-bearing age who have nutritional problems were also undernourished as adolescents, have never been well nourished, or are undernourished women who have frequent pregnancies; thus the problem continues from one generation to another.

MILLEN, J.W., & WOOLAM, D.H.M. Maternal nutrition in relation to abnormal fetal development. *Proceedings of the Nutrition Society*, 19(1):1-5, 1960.

A brief review of the relationship between maternal nutrition and fetal development is presented.

Nature, nurture, and stature. *Journal of the American Medical Association*, 209(11):1712-1713, 1969. (Editorial)

The main etiological factor in "failure to thrive" children is undernutrition which occurs secondarily to maternal neglect. These children are disturbed, withdrawn, apathetic, and retarded in growth and development; however, they show startling recovery when given long-term hospital care. It is clear that maternal neglect of proper infant feeding is the only causal factor in the syndrome.

NELIGEN, GERALD A., ROBSON, EVELYN, & WATSON, JOSEPH. Hypoglycemia in the newborn: A sequel of intrauterine malnutrition. *Lancet*, 1(7294):1282, 1963.

Low blood-sugar levels occur during the first 4 to 5 days of life in malnourished neonates, classified by weight/maturity scales. In symptomatic cases such as gross neurological disturbances, glucose is given intraveneously; however, a predisposition to hypoglycemia may ensue.

PITT, DAVID B., & SAMPSON, PATRICIA E. Congenital malformations and maternal diet. *Australasian Annals of Medicine*, 10:268-274, 1961.

A 3-year investigation of malformed infants found that mothers of infants with congenital abnormalities had nutritionally deficient diets as compared to control mothers.

RAHIMTOOLA, RAZIA J., MIR, SARAH, & BALOCK, S. Low birth weight, the "small for dates" syndrome and perinatal mortality in a low family income group. *Acta Paediatrica Scandinavica*, 57(6):534-536, 1968.

In 1,100 consecutive deliveries, 17% of the infants were "small for dates" newborns with birth-weight under 2500 g despite a gestational age of more than 36 weeks. Seven of these "small for dates" infants had gross congenital abnormalities and 24 were stillborn. The incidence of these intrauterine malnutrition cases is 17% higher in lower income groups in Pakistan.

RANDAL, JUDITH. Hunger: Does it cause brain damage? *Think*, 32(6):2-7, 1966.

Early findings of a study of 300 Mexican village children indicate that the earlier in life nutritional deprivation occurs, the greater its effect on intelligence. There is a relationship between protein deficiency, small size, and poor mental functioning. Deprivation of essential amino acids in early life may lead to permanent mental impairment.

REISNER, S.H., FORBES, A.E., CORNBLATH, M. The smaller of twins and hypoglycaemia. *Lancet*, 1(7384):524-526, 1965.

Neonatal hypoglycemia is discussed in 11 sets of twins. It is invariably found in the smaller twin and is suggested as an etiological agent in the retarded mental and physical development in the smaller twin. The smaller twin is believed to be an example of intrauterine malnutrition and the larger twin is a natural control.

RICHARDSON, STEPHEN A. The influence of social-environmental and nutritional factors on mental ability. In: Scrimshaw, Nevin, & Gordon, John E. *Malnutrition, Learning, and Behavior.* Cambridge, Massachusetts, MIT Press, 1968, p. 346-361.

Evidence for the effects of social factors on mental functioning of children is summarized. In order to demonstrate malnutrition as a cause of poor performance it is necessary to demonstrate an influence separate from that of social environment and better measurements of infant intelligence are needed.

RILEY, R.L., LANDWIRTH, J., KAPLAN, S.A., & COLLIPP, P.J. Failure to thrive: An analysis of 83 cases. *California Medicine*, 108(1):32-38, 1968.

Case histories of 83 children diagnosed as failing to thrive revealed 26 MRs. Maternal deprivation, congenital anomalies, and prematurity were contributing factors.

ROSENBAUM, A.L., CHURCHILL, J.A., & SHAKHASHIRI, Z.A. Neuropsychologic outcome of children whose mothers had proteinuria during pregnancy. *Obstetrics and Gynecology*, 33(January):118-123, 1969.

Mothers with proteinuria during the second half of pregnancy gave birth to 53 offspring with poor neurologic and psychologic performance in infancy and childhood than did a control group.

SCHWARTZ, LAWRENCE H., SNIDER, JESSIE, & SCHWARTZ, JANE E. Psychiatric case report of nutritional battering with implications for community agencies. *Community Mental Health Journal*, 3(2):163-169, 1967.

The case history of a 19-year-old female who was subjected to nutritional battering and severe psychological trauma from birth to 13 years of age is presented. Although rescued from this environment and institutionalized, the girl remained slightly retarded and even after several years of tutoring was only able to do average school work.

THOMSON, ANGUS M. Historical perspectives of nutrition, reproduction, and growth. In: Scrimshaw, Nevin, & Gordon, John E., eds. *Malnutrition, Learning, and Behavior*. Cambridge, Massachusetts, MIT Press, 1968, p. 17-30.

Physiological adjustments made by the pregnant woman which favor the fetus even through periods of nutritional stress are discussed. It is pointed out that the nutritional state of the mother is most important during the time of conception and organ development rather than later. Factors dependent upon socioeconomic and cultural status also play a part in the development of nutritional deficiencies. It is noted that "protein-caloric deficiency" is a term which needs more precise definition.

TIZARD, J. Cultural deprivation and mental handicap. *Nursing Mirror*, 128(17):32-33, 1969.

Among environmental factors resulting in mild mental retardation are malnutrition, disease, and cultural deprivation. Animal studies have clearly demonstrated that severe malnutrition in infancy causes changes in brain composition; therefore, it seems likely that poor feeding over long periods can also result in changes in the chemistry of the brain.

TREMBLAT, PIERRE C., SYBULSKI, STELLA, & MAUGHAN, GEORGE B. Role of the placenta in fetal malnutrition. *American Journal of Obstetrics and Gynecology*, 91(5):597-605, 1965.

Evaluations of placentas from normal and abnormal pregnancies revealed that in cases of fetal malnutrition placental oxygen utilization was significantly below normal, both quantitative and qualitative changes in the placenta may occur, and feto-placental weight ratio was consistently below normal.

WARKANY, JOSEF, MONROE, BERRY B., & SUTHERLAND, BETTY S. Intrauterine growth retardation. *American Journal of Diseases of Children*, 102(2):249-279, 1961.

Approximately 8,000 infants suffering from intrauterine growth retardation are born annually in the United States. MR is often associated with stunted growth and lagging social development in these children. It appears that malnutrition of the fetus *in utero*, is the major factor in this syndrome.

WITKOP, CARL J., JR. Genetics and nutrition. *Federation Proceedings*, 26(1):148-151, 1967.

Urinary findings in children with kwashiorkor are similar to those in Ss with phenylketonuria and histidinemia; this indicates an enzyme deficiency.

DIAGNOSIS

FORD, F.J. Can a standard for "malnutrition" in childhood be devised? *Journal of Tropical Pediatrics and African Child Health*, 10(2):47-58, 1964.

A weight standard for children is suggested as a means for defining malnutrition. Sixty-six percent of an agreed weight for age would constitute malnutrition. There is enough similarity of children's weights throughout the world to make such a standard a practical technique for comparing children of different countries, ethnic groups, and races.

WAGNER, M., WAGNER, G., & MATHIS, R. Measurement of nutritional status of newborn infants. *Biologia Neonatorum*, 11(1-2):106-114, 1967.

Skinfold thicknesses at 4 sites correlated with birth-weight, height, height-weight ratio, age, and nutritional state.

WHITEHEAD, R.G. Biochemical tests for assessing subclinical nutritional deficiency. *Clinical Pediatrics*, 6(9):516-518, 1967.

Because subclinical malnutrition causes growth retardation, reduces resistance to infection, and may adversely affect brain development, a biochemical test to detect the marginal or subacute forms would be very useful. Some tests now used are: the amino acid ratio; the urinary urea ratio with creatinine; and the urinary hydroxyproline ratio with creatinine. Although these tests are influenced by intercurrent infections and parasites, they can provide objective criteria of a S's nutritional state when properly used.

WHITEHEAD, R.G. Biochemical tests in differential diagnosis of protein and calorie deficiencies. *Archives of Disease in Childhood*, 42(225):479-484, 1967.

Blood serum protein, the amino acid ratio, and the hydroxyproline index were used to differentiate between nutritional marasmus and 2 types of kwashiorkor in 52 Ugandan children.

EFFECTS
Clinical

ALTSCHULE, MARK D. Some metabolic disorders in the protein-deficiency syndrome. *Lippincott's Medical Science*, 17(4):48, 1966.

Kwashiorkor patients are unable to metabolize certain amino acids; this results in an accumulation of poisonous compounds in the body. Three metabolic disorders which appear to be associated with kwashiorkor are: phenylketonuria, scurvy, and a histidine metabolic disorder.

BAIG, H.A., & EDOZIEN, J.C. Carbohydrate metabolism in kwashiorkor. *Lancet*, 2(7414):662-665, 1965.

Glucose utilization is noted to be disturbed in patients with kwashiorkor and such patients are found to have reduced fasting blood sugar, diminished glucose tolerance, low plasma insulin, and diminished adrenocortical function. These disorders can be explained by insulin hypersensitivity and poor pancreatic response to intravenous glucose in kwashiorkor Ss.

BALMER, SUSAN, HOWELLS, GLAN, & WHARTON, BRIAN. The acute encephalopathy of kwashiorkor. *Developmental Medicine and Child Neurology*, 10(6)766-771, 1968.

Biochemical estimates on 159 children with kwashiorkor demonstrated differences between drowsy and non-drowsy patients only in the hydroxyproline index and in serum sodium levels. The encephalopathy is thought to be due to disturbances in water and electrolyte movement across the blood-brain barrier. Rapidly acting diuretics are suggested as being of possible value in treatment.

BARAITSER, M., & EVANS, D.E. The effect of undernutrition brain-rhythm development. *South African Medical Journal*, 43(3):56-58, 1969.

The hypothesis that EEG rhythms are retarded in children who were subjected to early undernutrition is confirmed.

BARNES, RICHARD H. Malnutrition in early life and mental development. *New York State Journal of Medicine*, 65:2816-2817, 1965.

Data from experimental animal studies and psychological test results from malnourished children under 6 years of age strongly suggest that behavioral abnormalities and low scores on psychological development tests occur during the acute stages of malnutrition, and that infants with protein-calorie malnutrition do not demonstrate psychological test score improvement during a short-term recovery period.

BIRCH, HERBERT G., & CRAVIOTO, JOAQUIN. Infection, nutrition, and environment in mental development. In: Eichewald, Heinz F., ed. *The Prevention of Mental Retardation Through Control of Infectious Diseases.* (PHS publication Number 1692), Washington, D. C., Superintendent of Documents, U. S. Government Printing Office, 1968, p. 227-248.

Studies in Guatemala, Mexico, and Yugoslavia found a correlation between malnourishment and IQ; infections in malnourished children are more severe with more complications. Children who grew better performed better on visual, haptic, kinesthetic, and reading measurements. This, in turn, was dependent upon the child's nutritional environment.

BOTHA-ANTOUN, E., BABAYAN, S., & HARFOUCHE, J.K. Intellectual development related to nutrition status. *Journal of Tropical Pediatrics*, 14(3):112-115, 1968.

Twenty-two Lebanese children (CA 4-5 yrs) who had suffered from undernutrition from 3 months after birth until about 18 months demonstrated significantly lower IQs than a control group. The malnourished children also were slower in learning to walk and talk than the controls.

BROWN, ROY E. Organ weight in malnutrition with special reference to brain weight. *Developmental Medicine and Child Neurology*, 8(5):512-522, 1966.

Heart, liver, and spleen weights were less in malnourished children in Uganda than in non-malnourished children as determined by autopsies on 1,094 children. Brain weights were also reduced; however, the brain weight made up a greater percentage of the body weight which indicates that the brain has some resistance to malnutrition. The brain appears to be most sensitive to malnourishment from the fifth fetal month to the end of the first year of life.

CABAK, VERA, & NAJDANVIC, R. Effect of undernutrition in early life on physical and mental development. *Archives of Disease in Childhood*, 40(213):532-534, 1965.

Thirty-six children admitted for malnutrition to the Hospital for Sick Children in Sarajevo, Yugoslavia between 1951 and 1957 were studied to compare their present physical and mental characteristics with a control group of children. Of the 36 children, 18 had IQs between 91 and 110; 12 had IQs between 71 and 90; and 6 had IQs below 70. A strong correlation was found between low weight at hospital admission and present IQ.

CHAMPAKAM, S., SRIKANT, S.G., & GOPALAN, G. Kwashiorkor and mental development. *American Journal of Clinical Nutrition*, 21(8):866-872, 1968.

In a longitudinal study of 19 children previously treated for kwashiorkor and a control group, both of whom were administered intelligence and sensory development tests, it was found that the kwashiorkor children scored significantly lower than the control group. The difference between the groups tended to decrease with age. Retarded performance was greatest in perceptual and abstract abilities.

CHEEK, DONALD B., & COOKE, ROBERT E. Growth and growth retardation. *Annual Review of Medicine*, 15:357-382, 1964.

Factors associated with malnutrition in infants and children include weight loss, reduced height, skeletal immaturity, emotional and physical incapacity, gastroenteritis, expansion of the extracellular phase relative to body weight, edema, eythematous skin, reduced hemoglobin and red blood cell count, hypoproteinemia, low blood pressure, reduced cardiac stroke volume, prolonged circulation time, hypoglycemia, change in liver cell DNA content, diarrhea, dehydration, potassium deficiency, Mg deficiency, and extracellular hypotonicity.

COURSIN, DAVID BAIRD. Effects of undernutrition on central nervous system function. *Nutrition Reviews*, 23(3):65-68, 1965.

A review of the literature on malnutrition and MR is given.

CRAVIOTO, JOAQUIN. Nutricion infantil: III. Influencia de la desnutricion sobre el desarrollo mental del nino (Infant nutrition: III. Influence of malnutrition on the mental development of children). *Gaceta Medica de Mexico*, 97(12):1540-1554, 1967.

A presentation of animal and human studies which demonstrate clearly the adverse effect of early infant malnutrition on later mental development is given.

CRAVIOTO, JOAQUIN. La desnutricion proleicocalorica y el desarrollo psicobiologico del nino (Protein-calorie malnutrition and psychological development in the child.) *Boletin de la Oficina Sanitaria Panamericana*, 61(4):285-306, 1966.

Although more children survive severe protein calorie malnutrition than die, studies have shown that these children remain retarded in learning, in physical development, and in some aspects of their biochemical maturation. EEG studies have shown changes in brain waves, even in mild malnutrition; psychological test behavior is, in all cases of malnutrition, retarded. Evaluation of development of brain functioning indicates that malnutrition interferes with intersensory organization.

CRAVIOTO, JOAQUIN, DE LICARDIE, ELSA ROCA, & BIRCH, HERBERT G. Nutrition, growth and neurointegrative development: An experimental and ecologic study. *Pediatrics*, 38(Supplement:Part II):319, 1966.

All school age children in a rural Guatemalan village were incorporated into a study of the effects of malnutrition on growth and mental development and were compared with a group of urban school age children. Shorter children scored lower within the rural group and the rural group as a whole did poorer than the urban group. An overview of work in the field is also presented.

CRAVIOTO, JOAQUIN, DE LACARDIE, ELSA ROCA, & YEGA, LEOPOLDO. Amino acid-protein malnutrition and mental development. In: Nyhan, William L., ed. *Amino Acid Metabolism and Genetic Variation*. New York, New York, McGraw-Hill, 1967, p. 449-458.

Two groups of children with the same ethnic background, chosen retrospectively as having had amino acid-protein malnutrition on the basis of a severe reduction in height were found to have a decreased intersensory perception and decreased ability to integrate auditory and visual stimuli when compared to a control group.

CRAVIOTO, JOAQUIN, ESPINOSA GAONA, CARLOS, & BIRCH, HERBERT G. Early malnutrition and auditory-visual integration in school-age children. *Journal of Special Education*, 2(1):75-82, 1967.

A study on all 7 to 12 year olds enrolled in the primary school of a rural village in Southwestern Mexico demonstrated that early malnutrition has a deleterious effect on the neurointegrative development as manifested by a decreased ability to integrate visual, haptic, and kinesthetic information or to identify equivalent auditory and visual cues.

CRUICKSHANK, ERIC K. Neuromuscular disease in relation to nutrition. *Federation Proceedings*, 20(Supplement 7):345-352, 1961.

A grouping of 3 major categories of syndromes associated with malnutrition and a discussion of clinical neuromuscular aspects is presented.

DOBBING, J. Early malnutrition in relation to development of brain and behaviour. In: Richards, B.W., ed. *Proceedings of the First Congress of the International Association for the Scientific Study of Mental Deficiency*, held September 12-20, 1967, Montpellier, France. Surrey, England, Michael Jackson Publishing, 1968, p. 519-520.

Undernutrition very early in life is associated with lasting behavioral and intellectual defects and the severity of these defects appears to be related as much to the early timing of the malnutrition as to its severity. The multiple factors involved in the effects of undernutrition of the human brain make future controlled animal studies essential.

DREYFUS, PIERRE M. Nutritional disorders of the nervous system. Part I. Specific vitamin deficiencies. *Lippincott's Medical Science*, 17(3):44-50, 1966.

The effects of vitamin deficiencies on the nervous system are discussed.

EICHENWALD, HEINZ F., & FRY, PEGGY CROOKE. Nutrition and learning. *Science*, 163(3868):644-648, 1969.

A review of observations on animals and human infants and the effects that malnutrition during critical stages in early life may have is presented.

GRAHAM, GEORGE G. Effect of infantile malnutrition on growth. *Federation Proceedings*, 26(1):139-143, 1967.

Lack of adequate diet during infancy can have marked and sometimes permanent effects on later growth, especially the growth of the head. Even after the resumption of proper diet, the head circumference and height of 53 severely malnourished children, who were studied for an average of 34 months, were significantly below the fiftieth percentile. The effects of malnutrition on head size are more pronounced and more irreversible if the malnutrition is severe, lengthy, and occurs during the first year of life.

HARNACK, G.A. Does hunger during infancy inhibit brain growth and development of intelligence. *Deutsche Medizinische Wochenschinft*, 89(41):1957-1958, 1964.

The effect of undernutrition of infant and/or mother upon later intelligence and brain development is discussed.

HUGHES, ELIZABETH A., STEVENS, L.H., & WILKINSON, A.W. Some aspects of starvation in the newborn baby. *Archives of Disease in Childhood*, 39(208):598-604, 1964.

Two infants subjected to starvation from birth to 10 and 16 days of age were studied in regard to their biochemistry and short-term effects.

KRUEGER, RUTH H. Some long-term effects of severe malnutrition in early life. *Lancet*, 2(7619):514-517, 1969.

Follow-up studies on 152 African children who had been treated for severe protein deficiency between 1954 and 1958, demonstrated that the early malnutrition resulted in stunted height and weight 6 to 11 years later.

LATHAM, MICHAEL C., ed. *Human Nutrition in Tropical Africa*. Rome, Italy, F.A.O., 1965.

The effects of undernutrition on humans in tropical Africa are discussed and public health measures presented.

LYENGAR, LEELA. Urinary estrogen excretion in undernourished pregnant Indian women. *American Journal of Obstetrics and Gynecology*, 102(6):834-838, 1968.

Urinary estrogen excretion was significantly higher in 96 pregnant women from a high socioeconomic group than

it was in 120 pregnant women from a low socioeconomic group. Dietary supplements administered to the low group significantly raised their estrogen levels. Infant birth-weight correlated with urinary estrogen level.

MANCELL, ELLIOTT, & McENTEE, WILLIAM J. Alterations of the cerebellar cortex in nutritional encephalopathy. *Neurology*, 15(4):303-313, 1965.

Although the cerebellar disorders of an 18-year-old boy who was severely undernourished because of intestinal obstruction were similar to those found in Wernicke's encephalopathy and in cerebellar disease in chronic alcoholics, they appeared to be due to nutritional depletion rather than to the toxic effect of alcohol. Pathological alterations were found in the brain stem, basal nuclear masses, and cerebellar cortex.

Mental development following nutritional marasmus. *Nutrition Reviews*, 26(4):111-113, 1968.

The Bayley Infant Scales for Mental and Motor Development administered to Peruvian children who had recovered from marasmus showed that they were severely retarded, both mentally and physically.

MOENCKEBER, FERNANDO. Effect of early marasmic malnutrition on subsequent physical and psychological development. In: Scrimshaw, Nevin, & Gordon, John E., eds. *Malnutrition, Learning, and Behavior*. Cambridge, Massachusetts, MIT Press, 1968, p. 269-278.

Evidence is presented that severe undernutrition during the first 2 years of life will result in permanently reduced brain size, and therefore, restricted intellectual development.

NAEYE, RICHARD L. Malnutrition: Probable cause of fetal growth retardation. *Archives of Pathology*, 79(3):284-291, 1965.

Autopsy material from 11 infants with antenatal growth retardation and 7 infants with alimentary malnutrition demonstrate that the liver and spleen were abnormally small, many organs had a subnormal amount of cytoplasm, and other similarities which suggest malnutrition as a cause of fetal growth retardation.

NAEYE, RICHARD L. Organ and cellular development in congenital heart disease and in alimentary malnutrition. *Journal of Pediatrics*, 67(3):447-458, 1965.

A study of 12 infants with congenital cardiac malformations and 7 infants with alimentary malnutrition revealed similar organ abnormalities suggesting malnutrition as a common cause.

Nutrition and Intellectual Growth in Children. Washington, D.C., Association for Childhood Education International, 1969, 63 p. $1.25.

The consequences of hunger and malnutrition upon the physical, mental, and behavioral development of children are discussed in a series of papers presented by authorities in the fields of nutrition, psychology, and physiology.

Nutrition and the developing brain. *British Medical Journal*, 1(5588):333-334, 1968. (Editorial)

Studies on infants with brain damage resulting from improper nutrition, both before and after birth are discussed. Detection of persistent difficult behavior in infants, proper diagnosis of the malnutrition, and subsequent treatment are required of pediatricians.

Nutrition of brain in infancy. *British Medical Journal*, 1(5384):651, 1964.

The results of a comparative longitudinal study of a group of severely undernourished infants and a group of infants who received adequate nutrition suggest that severe poor nutrition in infancy can retard intellectual development.

O'DELL, BOYD L. Trace elements in embryonic development. *Federation Proceedings*, 27(1):199-204, 1968.

A narrow and critical range of requirements for trace elements exists in embryonic development and deviations from the optimum levels can cause hydrocephalus (cobalt or folic acid deficiency); neonatal ataxia (copper deficiency); increased congenital malformations (zinc and iron deficiency); and many other abnormalities.

PLATT, B.S., & WHEELER, ERICA F. Protein-calorie deficiency and the central nervous system. *Developmental Medicine and Child Neurology*, 9(1):104-105, 1967.

Brain damage which is later evidenced by poor educational performance can result from malnutrition in infancy and early childhood. Malnutrition during childhood sometimes results in brain weight which is below normal.

RAMOS-GALVAN, RAFAEL, NAVARETE, J.L.P., & MUNOZ, J.C. *Boletin Medica del Hospital Infantil de Mexico*, 17:455, 1960.

Studies of Mexican children revealed that uncorrected malnutrition causes nerve cell activity aberrations which are irreversible within months.

ROBLES, B., RAMOS-GALVAN, RAFAEL, & CRAVIOTO, JOAQUIN. Valoracion de la conducta del nino con desnutricion avanzada y de sus modificationes durante la recuperacion (Behavior of the severely malnourished child and its modification during the recovery period). *Boletin Medica del Hospital Infantil de Mexico*, 16(4):317-341, 1959.

Preliminary data on the effects of severe malnutrition upon the behavioral, physical, and mental development of children in Mexico is presented.

SCOTT, K.E., & USHER, R. Epiphyseal development in fetal malnutrition syndrome. *New England Journal of Medicine*, 270:822-824, 1964.

Severe fetal malnutrition results in marked delay in epiphyseal development during the intrauterine period. A comparison of the epiphyseal development of the knee at birth of 30 infants with fetal malnutrition syndrome and 18 normal infants revealed that malnourished infants evidenced a higher incidence of absence of the distal femoral epiphysis and of the proximal distal epiphysis. When the epiphyses were present in malnourished infants, they were much smaller than in the normal infants.

SCRIMSHAW, NEVIN S. Infant malnutrition and adult learning. *Saturday Review*, 84(March):64-66, 1968.

A review of nutritional studies of animals and humans indicates that severe nutritional deficiency which occurs at an early age can have profound and permanently detrimental effects on physical growth, learning, and behavior. Malnourished human infants can have marasmus or kwashiorkor, and evidence a high mortality rate, retarded linear growth, impaired brain growth, low intelligence test scores, retarded language skills, and poor intersensory integration abilities.

STOCK, M.B., & SMYTHE, P.M. Does undernutrition during infancy inhibit brain growth and subsequent intellectual development? *Archives of Disease in Childhood*, 38(202):546-552, 1963.

A group of Cape Coloured children who were grossly undernourished during the first year of life were significantly below a control group in brain growth, head circumference, and IQ although parents of both groups did not show significant differences. A follow-up period of 7 years showed no improvement in intellectual ability.

STOCK, M.B., & SMYTHE, P.M. The effect of undernutrition during infancy on subsequent brain growth and intellectual development. *South Africa Medical Journal*, 41(41):1027-1030, 1967.

Twenty children severely undernourished in infancy were found, 11 years later, to have significantly lower values for head circumference, height, weight, intellectual, and psychological scores than a control group of children selected from essentially the same socioeconomic level. It seems extremely likely that undernutrition during a period of active brain growth results in a significant and irreversible mental and physical impairment.

Undernutrition in children and subsequent brain growth and intellectual development. *Nutrition Reviews*, 26(7):197-199, 1968.

Reports of various researchers regarding malnutrition and methods of testing intellectual growth of children undernourished as infants revealed smaller head circumferences and retarded intellectual development which were not present in controls.

WIENER, G., RIDER, R.V., OPPEL, W.C., & HARPER, P.A. Correlates of low birth weight: Psychological status at eight to ten years of age. *Pediatric Research*, 2(2):110-118, 1968.

Intelligence tests at age 8 to 10 years of 500 low birth-weight infants showed increasing impairment with decreasing birth-weight.

WINICK, MYRON. Malnutrition and brain development. *Journal of Pediatrics*, 74(5):667-679, 1969.

The results of 2 types of malnutrition studies--physical and chemical brain growth and brain function--involving human and animal experiments show that a critical period exists in which even mild malnutrition for a short time causes irreversible damage.

WINICK, MYRON. Relationship between malnutrition and permanent brain damage. Paper presented at the Eighth International Congress on Nutrition held in Prague, Czechoslovakia August 28 to September 5, 1969.

Evidence indicates that malnutrition in the first few months of life may lead to permanent brain damage, primarily due to a reduction in brain cell division.

WINICK, MYRON, & ROSSO, PEDRO. The effect of severe early malnutrition on cellular growth of human brain. *Pediatric Research*, 3(2):181-184, 1969.

In 9 infants who died of malnutrition during the first year of life, less protein, RNA, and DNA were found in the brain than in 10 normal infants who died accidentally.

WINICK, MYRON, & ROSSO, PEDRO. Head circumference and cellular growth of the brain in normal and marasmic children. *Journal of Pediatrics*, 74(5):774-778, 1969.

A comparative study of head circumferences in malnourished and normal children revealed retarded brain growth in malnourished infants whose head circumferences were 2 standard deviations below the norm.

WITTMAN, W., MOODIE, A.D., HANSEN, J.D.L., & BROCK, J.F. Studies on protein-calorie malnutrition and infection. In: Wolstenholme, G.E.W., & O'Connor, Maeve, eds. *Nutrition and Infection*, (Ciba Foundation Study Group Number 31), Boston, Massachusetts, Little, Brown, and Company, 1967, p. 73-85; discussion 86-89.

Evidence is presented that protein calorie malnutrition and subsequent low weight for age enhances susceptibility to gastrointestinal infection, including diarrhea associated with pancreas and small bowel enzyme deficiencies.

EFFECTS
Related Studies

BARNES, RICHARD H. Experimental animal approaches to the study of early malnutrition and mental development. *Federation Proceedings*, 26(1):144-147, 1967.

Nutritional deprivation early in life is shown to affect learning capacity in animals. Low-protein diets fed to pigs will result in the occurrence of kwashiorkor symptoms. Early deprived pigs also show more violent reactions to shock. In rats, nutritional deprivation as neonates can affect learning in rehabilitated adults. The possibility exists that some degree of MR can result from mild undernutrition in early life.

BARNES, RICHARD H., MOORE, ULRIC, REID, IAN M., & POND, WILSON G. Effect of food deprivation on behavioral patterns. In: Scrimshaw, Nevin, & Gordon, John E., eds. *Malnutrition, Learning, and Behavior.* Cambridge, Massachusetts, MIT Press, 1968, p. 203-218.

Animal studies are presented which demonstrate that: undernutrition has long-lasting effects upon certain behaviors; these behavioral changes may influence learning if the learning depends on the behavioral changes; undernutrition has little effect upon complex problem solving situations; however, severe protein deficiency can retard learning; and there appears to be no relationship between the extent of behavioral change and the stunting of body size.

BARNES, RICHARD H., CUNNOLD, SUSAN ROBERTSON, ZIMMERMANN, ROBERT R., SIMMONS, HOWARD, MacLEOD, ROBERT B., & KROOK, LENNART. Influence of nutritional deprivations in early life on learning behavior of rats as measured by performance in a water maze. *Journal of Nutrition*, 89(4):399-410, 1966.

Male rats deprived both before and after weaning made significantly more errors in performance in a Y water maze than controls. Animals deprived either pre-or post-weaning alone gave intermediate results. Female rats appeared to be much less affected by early deprivation than the males.

BARNES, RICHARD H., NEELY, C.S., KWONG, E., LABADAN, B.A., & FRANKOVA. Postnatal nutritional deprivations as determinants of adult behavior toward food, its consumption and utilization. *Journal of Nutrition.* 96, 467-476, 1968.

Increased food spillage occurred in adult rats which were raised on a restricted diet for the first 7 weeks of life and was attributed to the elevated excitement under stress which has been noted in other studies of adult animals that were severely malnourished in early life. It was also noted that behavioral abnormalities in adult animals due to postnatal malnutrition are always accompanied by a stunting of body size.

BARNES, RICHARD H., MOORE, A. ULRIC, REID, IAN M., & POND, WILSON G. Learning behavior following nutritional deprivations in early life. *Journal of the American Dietetic Association*, 51(1):34-39, 1967.

Animal experiments with pigs and rats have demonstrated that: early malnutrition will cause measurable retardation in learning behavior even after rehabilitation; early malnutrition results in an alteration in motivation; the effects of early malnutrition on learning behavior appear to be very long lasting; and mild dietary restriction early in life can result in retarded learning and behavioral abnormalities.

BENTON, JOHN W., MOSER, HUGO W., DODGE, PHILIP R., & CARR, SHEILA. Modification of the schedule of myelination in the rat by early nutritional deprivation. *Pediatrics*, 38(5):801-807, 1966.

Nutritional deprivation during the first 21 days of life in rats resulted in decreased cerebral cerebrosides, myelination, lipids, cholesterol, and phospholipids. Deprived rats were also physically retarded.

BLACKWELL, BOON-NAM, BLACKWELL, R.Q., YU, THOMAS T.S., WENG, YIH-SHYONG, & CHOW, BACON F. Further studies on growth and feed utilization in progeny of underfed mother rats. *Journal of Nutrition*, 97(1):79-84, 1969.

Maternal dietary restriction during gestation and lactation in rat dams resulted in permanent growth stunting and impaired feed utilization in their progeny. Although the effects of maternal dietary restriction during gestation alone were less marked, they were also permanent, indicating that maternal dietary restriction during gestation exerts a definite influence on the development of progeny.

BOYD, ELDON M., & CHEN, C.P. Lindane toxicity and protein-deficient diet. *Archives of Environmental Health*, 17(2):156-163, 1968.

Cachectic rats who had been fed a low-protein diet from weaning were found to be twice as susceptible to the toxic effects of lindane.

BROWN, MYRTLE L., & GUTHRIE, HELEN A. Effect of severe undernutrition in early life upon body and organ weights in adult rats. *Growth*, 32(2):143-151, 1968.

Body and organ weights of male rats subjected to severe undernutrition from 2 days after birth until 19 weeks were depressed when compared with controls. Results are discussed in relation to critical periods of growth and cell division.

CALDWELL, DONALD F., & CHURCHILL, JOHN A. Learning ability in the progeny of rats administered a protein-deficient diet during the second half of gestation. *Neurology*, 17(1):95-99, 1967.

Offspring of rats deprived of protein from midpregnancy to term were significantly smaller at birth, had a highermortality rate, and performed less well on learning tasks than control rats. Significant cause of MR in lower socioeconomic groups may be intrauterine nutritional impoverishment.

CHASE, H. PETER, DORSEY, JAMES, & McKHANN, GUY M. The effect of malnutrition on the synthesis of a myelin lipid. *Pediatrics*, 40(4,I):551-559, 1967.

Rats which were nutritionally deprived from birth to 21 days had a decreased synthesis of sulfatide which was not corrected by refeeding. A significant decrease in brain weight, brain lipid, and body weight was also found in the experimental rats and was only partially reversible.

A chat with Dr. Dubos: "Neonatal deprivations can be permanent ones." *Journal of the American Medical Association*, 205(10):34-35, 1968.

A discussion of the reactions of experimental mice exposed to a crowded environment and a comparison with human urban populations is given.

CHOW, BACON F., & LEE, CHI-JIN. Effect of dietary restriction of pregnant rats on body weight gain of the offspring. *Journal of Nutrition* , 82:10-18, 1964.

Restriction of dietary intake by as little as 25% during gestation and lactation of rats resulted in growth stunting of progenies, anemia, and a decreased resistance to cold. Such effects could be corrected by pituitary extract or growth hormone administration shortly after weaning, but not after 3 months of age.

CHOW, BACON F., BLACKWELL, R. QUENTON& SHERWIN, ROGER W. Nutrition and development. *Borden Review of Nutrition Research* 29:25-39, 1968.

Animal studies of perinatal malnutrition show that: undernutrition permanently affects the fetus and neonate and causes behavioral abnormalities; maternal nutrition appears to profoundly influence the fetus and neonate; and body weight at birth or later does not indicate developmental potential.

COLLIER, GEORGE, & SQUIBB, ROBERT L. Diet and activity. *Journal of Comparative and Physiological Psychology*, 64(3):409-413, 1967.

Examination of the interrelationships of activity and dietary intakes of rats fed isocaloric diets containing deficient and excessive amounts of protein revealed that deviant ratios of protein to carbohydrate produced low rates of growth in non-active control animals, low protein diets resulted in high activity levels which did not affect growth rates, and high protein diets resulted in environmentally dependent low or normal activity levels and in high growth rates in active animals. Activity or diet had no effect on liver nuclei and free amino acids.

COLLIER, GEORGE, SQUIBB, ROBERT L., & JACKSON, F. Activity as a function of diet. *Psychonomic Science*, 3(5):173-174, 1965.

Evaluation of the spontaneous activity of rats fed isocaloric diets which were complete in all essentials and contained varying amounts of protein suggests that dietary imbalances similar to deficiencies may affect motivation. Animals on low protein diets exhibited the highest activity levels and animals on high protein diets exhibited the lowest activity levels.

CONLEY, J.J., & GRIESEL, R.D. The development of second-generation low-protein rats. *Journal of Genetic Psychology*, 103(6):233-242, 1963.

The effects of a low-protein diet on the growth and development of second generation rat pups of bitches reared on a low-protein diet included retardation in growth, delayed emergence of motor activity and response to auditory stimulation, marked frequency of suckling, and retardation of intelligence at maturity.

CONLEY, J.J., & GRIESEL, R.D. Some effects of a low protein diet on a first filial generation of white rats. *Journal of Genetic Psychology*, 95(6):187-201, 1959.

The results of the use of a low protein diet with successive generations of white rats included reduced intelligence, retardation of growth, and high mortality rates in the first filial generation.

COWLEY, JOHN J. Time, place, and nutrition: Some observations from animal studies. In: Scrimshaw, Nevin, & Gordon, John E., eds. *Malnutrition, Learning, and Behavior.* Cambridge, Massachusetts, MIT Press, 1968, p. 218-228.

Poorer test performance was demonstrated in successive generations of rats fed deficient diets. Results with a control generation, first filial low-protein generation, and third filial low-protein generation rats show that mean error scores indicate a progressive increase from the control group through the third generation; furthermore, the development of the young is also progressively more retarded through the third generation.

CULLEY, WILLIAM J., & LINEBERGER, ROBERT O. Effect of undernutrition on the size and composition of the rat brain. *Journal of Nutrition*, 96(3):375-381, 1968.

Studies are presented which indicate that the rat brain establishes the ability to recover from food restriction between 11 and 17 days of age and that this ability may be dependent on the number and type of brain cells present at 17 days of age. The cerebellum was the most severely affected, in terms of weight and DNA content, by restricted feeding.

CULLEY, WILLIAM J., & MERTZ, EDWIN T. Effect of restricted food intake on growth and composition of preweaning rat brain. *Proceedings of the Society for Experimental Biology and Medicine*, 118(1):233-235, 1965.

The incorporation of nonlipid solids, cholesterol, phospholipids, and cerebrosides in the brain of rats was reduced by restricting food intake from 5 to 20 days of age.

D'AMATO, M.R. Effect of litter size on brightness discrimination and reversal. *Psychological Reports*, 7(1):91-97, 1960.

Litter size did not affect the discrimination or discrimination reversal learning of rats reared in 4, 8, or 16 pup groups. Testing conditions were thirst motivation with water reward, and hunger motivation with sucrose solution reward.

DAVISON, A.N. The influence of nutritional disorder on the lipid composition of the central nervous system. *Proceedings of the Nutrition Society*, 27(1):83-85, 1968.

Evidence indicates that nutritional deprivation during the period of myelination permanently affects lipid composition which may be related to intellectual growth.

DICKERSON, J.W.T., & DOBBING, J. Prenatal and postnatal growth and development of central nervous system of the pig. *Proceedings of the Royal Society of Medicine, Series B*, 166(1005):384-395, 1967.

In pigs, the most rapid period of brain growth and the period most susceptible to malnutrition, injury, or other natural stresses is from about 50 days before birth to about 40 days afterward.

Diet, development, and intelligence. *Nutrition Reviews*, 22(8):244-246, 1964.

The second generation of rats fed a marginal African type diet showed retarded growth and development and poorer intelligence test scores than did control rats.

DOBBING, JOHN. Effects of experimental undernutrition on development of the nervous system. In: Scrimshaw, Nevin, & Gordon, John E., eds. *Malnutrition, Learning, and Behavior.* Cambridge, Massachusetts, MIT Press, 1968, p. 181-202.

The physical effects of undernutrition upon brain morphology are described in pigs and rats. Even mild undernutrition can cause a decrease in the physical growth of the brain at certain fast growth periods and such mild restrictions often leave permanent sequelae. The correlation between the acutal physical deficits that are produced in the brain and the behavioral deficits that also have been observed in these animals needs further elucidation.

DOBBING, JOHN. The effect of undernutrition on myelination in the central nervous system. In: Hahn, P., & Koldovsky, O., eds. *Development of Metabolism as Related to Nutrition* (symposium). *Biologia Neonatorum*, 9(1-2):132-143;discussion, 143-147, 1966.

Three animal experiments are presented which demonstrate that undernutrition occurring during critical periods causes a decrease in myelination of the central nervous system.

DOBBING, JOHN. The influence of early nutrition on the development of myelination of the brain. *Proceedings of Royal Society of London, Series B*, 166(159):503-509, 1964

Controlling litter size of rats during lactation when brains are developing most actively can alter growth rate and cholesterol disposition in the brain, and not necessarily affect body weight.

DOBBING, JOHN, & WIDDOWSON, ELSIE M. The effect of undernutrition and subsequent rehabilitation on myelination of rat brain as measured by its composition. *Brain*, 88(2):357-366, 1965.

The effect of undernutrition and subsequent unlimited nourishment on the myelination of rat brain was investigated and the significance to malnutrition in human children discussed.

Early weaning, diet, and intelligence. *Nutrition Reviews*, 23(7):211-213, 1965.

Rats weaned at 15 days of age showed a poorer ability to master and remember a maze than those weaned at 30 days; however, when the rats are weaned to a high fat ration at an early age rather than to a stock ration, they did better than those weaned later.

EDOZIEN, JOSEPH C. Experimental kwashiorkor and marasmus. *Nature*, 220(5170):917-919, 1968.

This study demonstrated that kwashiorkor and marasmus can be produced experimentally in rats by feeding them a low protein diet. Such experimental models will contribute to the understanding of the regulation of metabolic processes and the interrelation of nutrition to mental development and infection.

ERSHOFF, B.H., & KRUGER, L. A neurological defect in the offspring of rats fed a pantothenic acid-deficient diet during pregnancy. *Experimental Medicine and Surgery*, 20:180-184, 1962

Specific neurological defects of motor coordination, righting reflexes, and head orientation were observed in offspring of rats fed a pantothenic acid deficient diet for the first 14 days of pregnancy.

FRANKOVA, SLAVKA. Nutritional and psychological factors in the development of spontaneous behavior in the rat. In: Scrimshaw, Nevin, & Gordon, John E., eds. *Malnutrition, Learning, and Behavior*. Cambridge, Massachusetts, MIT Press, 1968, p. 312-323.

A reduced caloric intake in early development results in decreased spontaneous activity of adult rats; however, these effects can be appreciably modified by stimulation. Similarities to orphanage children are pointed out.

FRANKOVA, SLAVKA, & BARNES, RICHARD H. Effect of malnutrition in early life on avoidance conditioning and behavior of adult rats. *Journal of Nutrition*, 96(4): 485-493, 1968.

Although there were no significant differences between control and previously malnourished rats in terms of learning rate, striking behavioral abnormalities, which included inadequate stereotyped movements, inability to delay or extinguish fixed conditioned reactions, and increased excitability, were noted.

FRANKOVA, SLAVKA, & BARNES, RICHARD H. Influence of malnutrition in early life on exploratory behavior of rats. *Journal of Nutrition*, 96(4):477-484, 1968.

Rats subjected to malnutrition in early life were found to have lower weights and lower development of exploratory behavior. After nutritional rehabilitation, exploratory activity remained below that of control animals. Males were more strikingly affected than females.

GUTHRIE, HELEN A., & BROWN, Myrtle L. Effect of severe undernutrition in early life on growth, brain size and composition in adult rats. *Journal of Nutrition*, 94(4):419-426, 1968.

Undernutrition during suckling caused partially irreversible body stunting. Brain size and DNA were irreversibly depressed by undernutrition in the preweaning period and brain cholesterol levels were significantly and irreversibly depressed if undernutrition occurred thru 5 weeks of age, but responded to earlier treatment.

HOWELL,J. McC., THOMPSON, J.N. Lesions associated with the developing of ataxia in vitamin A-deficient chicks. *British Journal of Nutrition*, 21(3):741-750, 1967.

The progress of CNS disorders in vitamin A-deficient chicks is discussed.

HOWELL, J. McC., & THOMPSON, J.N. Observations on the lesions in vitamin A deficient adult fowls with particular reference to changes in bone and central nervous system. *British Journal of Experimental Pathology*, 48(4): 450-454, 1967.

A controlled study involving 18 adult fowl (9 cockerels and 9 hens) which from hatching received vitamin A deficient diets supplemented with retonoic acid, refuted a previous observation that "after growth of the skeleton is completed, vitamin A deficiency has no specific effect upon bone structure."

LEE, CHI-JEN, & CHOW, BACON F. Metabolism of proteins by progeny of underfed mother rats. *Journal of Nutrition*, 94(1):20-26, 1968.

Progeny from dietary restricted mothers showed stunted growth, reduced feed efficiency, low nitrogen balance, and abnormal urinary nitrogen. Restricted progeny can utilize good protein as well as controls, but cannot utilize a poorer protein as efficiently. Restricted progeny excreted more free basic amino acids and more total amino acids than normal.

LEE, CHI-JEN, & CHOW, BACON F. Protein metabolism in the offspring of underfed mother rats. *Journal of Nutrition*, 87(4):439-443, 1965.

Progeny of rats subjected to a 50% dietary restriction during pregnancy and lactation excreted more than the normal amount of nitrogen and also had an abnormal distribution of nitrogen among componets of urine.

McCANCE, R.A. Some effects of undernutrition. *Journal of Pediatrics*, 65(6):1008-1014, 1964.

Effects of undernutrition and subsequent rehabilitation upon pigs, guinea pigs, and chickens are discussed and their application to human nutrition posed.

McCANCE, R.A., & WIDDOWSON, E.M. Nutrition and growth. *Proceedings of the Royal Society of London, Series B*, 156(964):326-337, 1962.

The effects of prolonged undernutrition on rats, chickens, pigs, and humans and contributing factors are discussed.

NAVAKOVA, V., FALTIN, J., FLANDERA, V., HAHN, P., & KOLDOVSKY, O. Effect of early and late weaning on learning in adult rats. *Nature*, 193(4812):280, 1962.

Male rats weaned prematurely (15 days) and normally (30 days) after birth illustrated the adverse effects of premature weaning and diet substitution upon learning ability.

OLEWINE, DONALD A., BARROWS, CHARLES H., Jr., & SHOCK, NATHAN W. Effect of reduced dietary intake on random and voluntary activity in male rats. *Journal of Gerontology*, 19(2):230-233, 1964.

The results of a controlled study of Sprague-Dawley strain weaning male rats subjected to a 50% reduction in food intake over an 8-month period indicate that, according to activity measurement, characteristics of restricted rats differ from normal controls.

PLATT, B.S.,& STEWART, R.J. Effects of protein-calorie deficiency on dogs. I. Reproduction, growth and behaviour. *Developmental Medicine and Child Neurology*, 10(1):3-24, 1968.

Low protein post-weaning diets resulted in slow growth; changes in bones, brains, and behavior; and in the production of smaller and fewer pups per litter by adult bitches. Congenitally malnourished pups given low protein diets evidenced more marked abnormalities in gait, growth, and EEG patterns than pups of normal mothers given low protein diets at weaning. Many of these abnormalities appeared when deficient animals were given high protein diets. However, full recovery may never occur in congenitally malnourished pups.

PLATT, B.S., PAMPIGLIONE, G., & STEWART, R.J.C. Experimental protein-calorie deficiency. *Developmental Medicine and Child Neurology*, 7(1):9-26, 1965.

Studies of pigs maintained on a protein-calorie deficient diet from 2 to 3 weeks of age reveal that the animals were very small; and had dry, scaly, wrinkled, and cracked skin, course, long hair, and stiff hind legs. Some animals exhibited failure of appetite, listlessness, some incoordination of the hind legs, and occasionally, sudden collapse and death. There was a marked decrease in the fast components in EEGs. The number of neuroglial cells in the spinal cord increased, and their nuclei showed signs of activation. There was a proliferation of astroceptic fibers in severe cases. Motor cells evidenced chromatolysis, pronounced satellitosis, reduced staining of the nuclei, and occassionally, Nissl's "severe change."

RAJALAKSHMI, R. GOVINDARAJAN, K., & RAMAKRISHNAN, C. Effects of dietary protein content on visual discrimination learning and brain biochemistry in the albino rat. *Journal of Neurochemistry*, 12(4):261-271, 1965.

Albino rats (1 month, 6 months, and 12 months old), which received total protein-deficient diets for 4-6 months, were tested psychologically, sacrificed, and biochemical brain analysis was compared with high-protein controls. Significant differences were found, but repletion of dietary protein reversed changes.

SERENI, F., PRINCIPI, N., PERLETTI, L., & SERENI, L. Piceni. Undernutrition and the developing rat brain. *Biologia Neonatorum*, 10(5-6):254-265, 1966.

Undernutrition from birth to either 21 or 35 days resulted in significantly reduced acetylcholinesterase activity, norepinephrine concentration, and 5-OH-tryptamine concentration in rat brains. Animals subjected to undernutrition for 35 days exhibited the greatest slowing of body and brain weight growth. All affected parameters except total brain weight returned to normal after starvation was discontinued.

SIMONSON, M., HANSON, H., HERRIOTT, R.M., STEPHAN, J.K., & CHOW, BACON F. Open field studies in offspring of underfed mother rats. Johns Hopkins University, Department of Biochemistry, School of Hygiene, Baltimore, Maryland.

Offspring of rats subjected to dietary restriction during the gestational period demonstrated elevated emotional behavior and decreased activity when compared with controls. In addition, the animals from restricted mothers were timid and had decreased social interaction.

SIMONSON, M., SHERWIN, R.W., ANILANE, J.K., YU, W.Y., & CHOW, B.F. Neuromotor development in progeny of underfed mother rats. *Journal of Nutrition*, 98(1):18-24, 1969.

The neuromotor development of progeny of mother rats subjected to 50% dietary restriction during gestation or gestation and lactation was delayed as much as 2 weeks and several abnormal types of activity occurred in the experimental rats but never in the controls.

SIMONSON, M., SHERWIN, R.W., HANSON, H.H., & CHOW, B.F. Maze performance in offspring of underfed mother rats. *Federation Proceedings*, 27:727, 1968.

Rats from underfed mother rats performing on an elevated multiple T-maze had means of running time and errors on the first trial almost double those of control animals. Also, the experimental group needed more trials to reach specific criteria, were more distractible, and passed more fecal boli.

SIMONSON, M., YU, W., ANILANE, J.K., SHERWIN, R.W., & CHOW, B.F. Studies of development in progeny of underfed rats. *Federation Proceedings*, 26:519, 1967.

Abnormal neuromotor development was demonstrated in progeny of underfed mother rats.

STEPHAN, J.K., & CHOW, B.F. Growth of progeny from rats underfed during gestation only. *Federation Proceedings*, 27:728, 1968.

Rats from mother rats underfed during gestation only had a lower mean birth weight than that of a control group; however, at weaning there was no significant difference in body weight. Nevertheless the body weight of the experimental rats remained at a lower level than the control group after 12 weeks of age.

STEWART, R.J.C., & PLATT, B.S. Nervous system damage in experimental protein-calorie deficiency. In: Scrimshaw, Nevin, & Gordon, John E., eds. *Malnutrition, Learning, and Behavior.* Cambridge, Massachusetts, MIT Press, 1968, p. 168-180.

Piglets subjected to protein-caloric deficiency and puppies born of mothers subjected to protein caloric deficient diets were underweight, undersized, and had motor disorders. Congenitally malnourished pups given low protein diets developed even more exaggerated motor disorders and their behavior became extremely abnormal. Brain weight of both experimental pigs and dogs are low when related to age and in the congenitally malnourished pups this deficit extends into adult life.

Underfeeding and brain development. *Nutrition Reviews*, 25(11):334-335, 1967.

Undernutrition results in retarded chemical and histological maturation of the brain in rats. An application to human development in "backward" countries is discussed.

Undernutrition and development of the central nervous system in the pig. *Nutrition Reviews*, 25(6):185-187, 1967.

Biological measurement studies of maturation of the central nervous system revealed retarded growth resulting from undernutrition.

VALADARES, J.R.E. The effects of pyridoxine deficiency on cardiac and brain phosphorylase in mice. *Biochimica et Biophysica Acta*, 136(6):296-300, 1967.

Results of reduction of total and phosphorylase *a* activities in brain and heart tissues of pyridoxine deficient mice and subsequent restoration in the brain indicate that vitamin B_6 is a cofactor for brain and myocardial phosphorylase.

VERMA, KUSUM, & WEI, KING DOROTHY. Disorders of the developing nervous system of vitamin E-deficient rats. *Acta Anatomica*, 67(4):623-635, 1967.

Vitamin E deficiency had deleterious effects on the brain stem, spinal cord, and choroid plexus at a very early stage of development. Hydrocephaly and exencephaly were also seen. Enzyme, lipid, and Nissl substance were affected.

WIDDOWSON, ELSIE M., & McCANCE, R.A. *Proceedings of the Royal Society of London, Series B*, 158(972): 329-341, 1963.

In rats, undernutrition after weaning caused progressively less difference in the ability to effect complete recovery; however, undernutrition before weaning prevented rats from obtaining the same size as controls, and the ultimate decrease in size was dependent upon the period in ontogeny in which the undernutrition occurred.

WIDDOWSON, ELSIE M., DICKERSON, J.W., & McCANCE, R.A. Severe undernutrition in growing and adult animals. *British Journal of Nutrition*, 14(4):457-471, 1960.

Chemical analysis of tissues from 8 malnourished pigs demonstrated that in some organs undernutrition reversed the normal process of chemical development while in other organs, it delayed the normal maturation. Both processes were found in the skin and brain.

WINICK, MYRON, FISH, IRVING, & ROSSO, PEDRO. Cellular recovery in rat tissues after a brief period of neonatal malnutrition. *Journal of Nutrition*, 95(4):623-626, 1968.

Rats undernourished for the first 9 days of life had a reduction in cell number which became normal at weaning if they were adequately fed from 9 days until they were weaned.

WINICK, MYRON, & NOBLE, ADELE. Cellular response in rats during malnutrition at various ages. *Journal of Nutrition*, 89(3):300, 1966.

Studies indicate that cellular effects of malnutrition depend on the growth phase of the animal at the time of malnutrition. Early malnutrition caused a decrease in cell division and the results were irreversible. Malnutrition at a later stage resulted in a reduction of cell size from which the animal could be rehabilitated.

WOODARD, JAMES CARROLL, & NEWBERNE, PAUL M. The pathogenesis of hydrocephalus in newborn rats deficient in vitamin B_{12}. *Journal of Embryology and Experimental Morphology*, 17(1):177-187, 1967.

Hydrocephalus caused by stenosis of the cerebral aqueduct associated with aplasia of the subcommissural organ and malformation of other neural structures is found in rats from mothers on a vitamin B_{12}-deficient diet.

ZAMENHOF, STEPHEN, VAN MARTHENS, EDITH, & MARGOLIC, FRANK L. DNA (cell number) and protein in neonatal brain: Alteration by maternal dietary protein restriction. *Science*, 160(3825):322-323, 1968.

Female rats maintained on a protein deficient diet for 1 month before mating and throughout gestation had offspring with significantly less cerebral DNA and protein when compared to offspring of a control group. The experimental group had significantly fewer cells and the protein content/cell was also lower. If, at birth, brain cells are predominantly neurons and their number becomes final at that time, such dietary restriction could result in permanent brain neuron deficiency and consequent MR.

ZIMMERMANN, ROBERT R., & STROBEL, DAVID A. Effects of protein malnutrition on visual curiosity, manipulation, and social behavior in the infant Rhesus monkey. *Proceedings of the 77th Annual Convention of the American Psychological Association*,. Washington, D.C., American Psychological Association, 1969, p. 241-242.

In 8 Rhesus monkeys, protein malnutrition produced apathy, retarded curiosity, retarded manipulation, and low social motivation.

TREATMENT & PROGNOSIS

Clinical

CABAK, VERA, NAJDANOVIC, R., CURCIC, B., SERSTNEV, E., & SKORIC, L. The long-term prognosis of infantile malnutrition. In: Richards, B.W., ed. *Proceedings of the First Congress of the International Association for the Scientific Study of Mental Deficiency*, held September 12-20, 1967, Montpellier, France. Surrey, England, 1968, p. 521-531.

Three hundred and forty-four children who had been treated for malnutrition in infancy were found at school age to have subnormal bone maturation and mental ability. Forty-six percent of the children had IQs between 71 and 90 and 5.8% had IQs below 70. A positive high correlation was found between IQs and weight at time of admission for treatment.

CRAVIOTO, JOAQUIN. Application of newer knowledge of nutrition on physical and mental growth and development. *American Journal of Public Health*, 53(11):1803-1809, 1963.

Nutritional status is one determinant of growth and size. Undernutrition retards CNS development, the younger the child with kwashiorkor, the more ineffective is the rehabilitation in improving mental scores.

CRAVIOTO, JOAQUIN, & ROBLES, BEATRIZ. Evolution of adaptive and motor behavior during rehabilitation from kwashiorkor. *American Journal of Orthopsychiatry*, 35(3):449-464, 1965.

The psychological test performance of 20 Mexican infants and children hospitalized for kwashiorkor is presented. It is suggested that children severely malnourished during the first 6 months of life never recover full mental facilities.

Deadline for saving starved minds. *Medical World News*, 9(37):91, 1968.

The time available for the nutritional rescue of stunted minds is less than 6 months from birth because cell division in the human brain stops after 6 months of age, and when this cell division stops there is no recovery. Severely malnourished children are likely to be MR permanently.

FRANKLE, REVA T., SENHOUSE, MIRIAM F., & COWELL, CATHERINE. Project Head Start; a challenge in creativity and community nutrition. *Journal of Home Economics*, 59(January): 1967.

Head Start programs in New York City emphasize nutritional improvement at a child development center. Consulting nutritionists assist in providing bases for eating habits, and nutritional concepts of right and wrong.

GARROW, J.S., & PIKE, M.C. The long term prognosis of severe infantile malnutrition. *Lancet*, 1(7480): 1-4, 1967.

Sixty-five Jamaican children were examined 2-8 years after having been treated for severe malnutrition. Although small when compared with North American children, they were within normal range for Jamaican children. When matched with siblings or close relatives, the previously malnourished children were slightly taller, heavier, and had thicker bone and muscle in the leg.

KOHLER, ELAINE E., & GOOD, THOMAS. The infant who fails to thrive. *Hospital Practice*, 4(7):54-60, 1969.

Five steps in detecting, evaluating, diagnosing, and correcting malnutrition in infants are discussed and illustrated by photos, charts, and detailed outlines in an attempt to increase successful rehabilitation of infants who fail to thrive.

MEDOVY, HARRY. New parameters in neonatal growth--cell number and cell size. *Journal of Pediatrics*, 71(3): 459-461, 1967.

Studies utilizing rat fetuses have shown that early malnutrition interferes with cell division while later malnutrition causes a reduction of individual cell size. It is to be expected that if the number of cells in the brain is decreased, MR will occur; however, if the cells are only decreased in size, an increase in growth may catch up to normal size and MR may not occur.

Prognosis for malnourished infants. *Nutrition Reviews*, 25(11):332-333, 1967.

Mortality for severely malnourished children was higher when the body weight deficit was large, severe dehydration was present, the liver was enlarged, and there was an increase in serum bilirubin.

RABOR, IOLE F., OH, WILLIAM, WU, PAUL Y.K., METCOFF, JACK, VAUGHN, MARY A., & GABLER, MARJORIE. The effects of early and late feeding of intrauterine malnourished (IUM) infants. *Pediatrics*, 42(2):261-269, 1968.

Early feeding of infants with signs of intrauterine malnutrition and birthweights below 2,040 grams raised their blood glucose levels significantly higher than similiar infants who were fed late. This suggests that early feeding aids glucose homeostasis and prevents neonatal symptomatic hypoglycemia.

VAHLQUIST, B. Malnutrition and infection in Ethiopia. In: Wolstenholme, G.E.W., & O'Connor, Maeve, eds. *Nutrition and Infection*, (Ciba Foundation Study Group No. 31). Boston, Massachusetts, Little,Brown and Company, 1967, p. 90-97.

The work of a joint project involving Ethiopian and Swedish governments with Ethiopian children who commonly exhibit the existence of malnutrition and infection is illustrated.

WHITTEN, CHARLES, PETTIT, MARVIN G., & FISCHHOFF, JOSEPH. Evidence that growth failure from maternal deprivation is secondary to undereating. *Journal of the American Medical Association*, 209(11):1675-1682, 1969.

Of 13 maternally deprived infants with growth failure, 11 gained weight at an accelerated rate when adequately fed. The data indicate that the infants were underweight not because of some psychologically induced defect in metabolism but because of undereating which was secondary to not being offered enough food.

TREATMENT AND PROGNOSIS
Related Studies

DICKERSON, J.W.T., & WALMSLEY, ANN L. The effect of undernutrition and subsequent rehabilitation on the growth and composition of the central nervous system of the rat. *Brain*, 90(4):897-906, 1967.

The effects of undernutrition and subsequent rehabilitation on brain weight, spinal cord thickness, and CNS composition are discussed.

DICKERSON, J.W.T., DOBBING, J., & McCANCE, R.A. The effect of undernutrition on the development of the brain and cord in pigs. *Proceedings of the Royal Society of Biology*, 166(1005):396-407, 1967.

Pigs subjected to undernutrition from 2 weeks to at least 1 year then rehabilitated, developed brain and cord to the size expected in a normal pig; however, the percentage of cholesterol and DNA-p remained subnormal.

NOVAKOVA, V., KOLDOVSKY, O., FALTIN, J., HAHN, P., & FLANDERA, V. The effect of premature weaning and high fat diet on retention of a memory trace in male rats. *Physiologia Bohemoslovenica*, 12(6):533-540, 1963.

A prematurely weaned group of rats demonstrated decreased retention of old memory trace and re-elaboration of a conditioned reflex; however, when a high fat diet was fed after weaning, this adverse effect on higher nervous activity did not take place.

STEWART, R.J.C., & PLATT, B.S. The influence of protein-calorie deficiency on the central nervous system. *Proceedings of the Nutrition Society*, 27(1):95-101, 1968.

Animal studies of central nervous system changes resulting from food deprivation indicate that the severity of irreversible changes may be modified by protein value in the diet, amount of diet, and early detection.

PREVENTION

AMERICAN ACADEMY OF PEDIATRICS. COMMITTEE ON NUTRITION. The relation between infantile hypercalcemia and vitamin D--Public health implications in North America. *Pediatrics*, 40(6):1050-1061, 1967.

Although the availability of vitamin D to pregnant women and children has reduced the incidence of rickets in the United States, this availability has resulted in some cases of severe hypercalcemia in which MR is a prominent feature. The recommended daily intake of vitamin D during pregnancy and childhood is 400 IU and should not be exceeded.

Better diet for brighter minds? *Medical World News*, 8(11):60-65, 1967.

Animal studies and human studies in South Africa, Mexico, and concentration camps have demonstrated that undernutrition of pregnant women or of children prior to the age of 4 will cause mental and physical retardation to fetuses and infants. The development of a fish protein concentrate or some similar high protein product would be one method of combating malnutrition.

BREWER, TOM. Human pregnancy nutrition: A clinical view. *Obstetrics and Gynecology*, 30(4):605-607, 1967.

If maternal nutrition is adequate, fetal nutrition is more likely to be adequate, and prematurity rates will be lower. An adequate diet for pregnant women should include: milk, 1 quart/day; meat, 2 servings/day; vegetable or fruit, 4 servings/day; bread or cereal, 4 servings/day; and iron supplement. The clinical obstetrician must take responsibility for the maintenance of adequate diets by their patients.

BROBERG, KATIE. Dr. Pereira predicts her country (India) may produce food supplement proteins. *NIH Record*, 21(20):1, 5, 1969.

Because malnutrition and starvation are major problems in India, with the problems beginning very early in life, research is centered upon producing fortified protein-rich supplements for infants and preschool children.

DAVIS, GEORGE K. Present status and outlook for a critical role of nutrition in the International Biological Program. *Federation Proceedings*, 27(3):954-956, 1968.

Nutrition science is a major concern of the International Biological Program in evaluating the use of biological sources to produce food for the people of the world. International cooperation is essential if all people are to be adequately fed.

EGAN, MARY C. Combating malnutrition through maternal and child health programs. *Children*, 16(2):67-71, 1969.

A review of some of the efforts to reach mothers and children with nutritional services is given. Emphasis is placed on nutritional education and some community resources.

HASELKORN, FLORENCE. Mothers-at-risk: The role of social work in prevention of morbidity in infants of socially disadvantaged mothers. In: *Perspectives in Social Work, Volume 1.* Garden City, New York, Adelphi University School of Social Publications, 1966, 162 p.

Infants of low-income women are vulnerable to handicap because of a combination of pathogenic environmental factors. In order to prevent morbidity in the infants of socially disadvantaged mothers, social workers should assume a role of preventive and therapeutic intervention.

HILLE, HELEN M., & REEVES, MARY. The battle against mental retardation: The dietitian's share. *Hospitals*, 38:101-106, 1964.

The dietitian's role in the establishment of good nutrition for mothers and infants is discussed, especially in regard to those mothers from low socioeconomic levels.

MARTIN, CODA. Can mental retardates be prevented? *Journal of Applied Nutrition*, 17(4):207-211, 1964.

Approximately 75% of today's teenagers have deficient diets. Accepting the premise that there is a relationship between nutrition and MR, then with 75% of future mothers on deficient diets, there can be anticipated a marked increase in congenital abnormalities and incidence of MR.

ADDENDUM

(Additional references without annotations are cited below)

BROWN, R. Decreased brain weight in malnutrition and its implications. *East African Medical Journal*, 42:584, 1965.

BROZEK, J. Experimental studies on the impact of deficient diet on behavior. *Borden Review of Nutrition Research*, 20:75-88, 1959.

BROZEK, J., & VAES, G. Experimental investigations on the effects of dietary deficiencies on animal and human behavior. *Vitamins and Hormones*, 19:43, 1961.

Central nervous system manifestations of nutritional deficiency. *Indian Journal of Pediatrics*, 35:46-53, 1968.

COWLEY, J.J., & GRIESEL, R.D. The effect on growth and behaviour of rehabilitating first and second generation low protein rats. *Animal Behavior*, 14:506-517, 1966.

CRAVIOTO, JOAQUIN. Malnutrition and behavioral development in the preschool child. *International Conference on the Prevention of Malnutrition in the Preschool Child.* Washington, D.C., December 7-11, 1964.

CRAVIOTO, JOAQUIN, & ROBLES, B. The influence of protein-calorie malnutrition on psychological test behavior. *Proceedings of the Swedish Nutrition Foundation.* Bastad & Gothemburg, 1962.

MILES, RAYMOND C. Effect of extreme deprivation on probability and rate increases of learned performance. *Psychonomic Bulletin*, 1(2):34, 1967.

MYSLIVECEK, J. Experimental analysis of the effect of early malnutrition on the development of nerve function. *Casopis Lekaru Ceskych*, 107:664-669, 1968.

PEK, HIEN LIANG, TJIOOK, TIAUW HIE, & OEY, HENK JAN. Evaluation of mental development in relation to early malnutrition. *Paediatrica Indonesia*, 7:119-125, 1967.

RAMOS, GALVAN R. Application of the Goodenough Test to Mexican students of different sociocultural groups and of varied states of nutrition: Study of children attending a private school in Mexico City. *Boletin Medica Hospital Infantil de Mexico*, 21:149-156, 1964.

RAMOS, GALVAN R., & VAZQUEZ, J. Application of the Goodenough Test to Mexican students of different sociocultural groups and of varied states of nutrition: Study of 1,197 children attending public schools in Mexico City. *Boletin Medica Hospital Infantil de Mexico*, 21:165-172, 1964.

SHARMA, U. Intra-uterine growth retardation. *Indian Journal of Pediatrics*, 35:454-459, 1968.

BROAD ASPECTS OF MENTAL RETARDATION

1 STEVENS, HARVEY A. Mental deficiency in an international perspective. In: Richards, B.W., ed. *Proceedings of the First Congress of the International Association for the Scientific Study of Mental Deficiency*, held September 12-20, 1967, Montpellier, France. Surrey, England, Michael Jackson Publishing, 1968, p. xxxi-xLi.

The care of the MR is a problem for all of society. There is a growing international recognition of the importance of nutrition in MR, of the dehumanizing effects of institutionalization, and of the importance of applying existing knowledge and information to the problem. The dependency of professional groups upon one another is stressed as is the importance of establishing and maintaining world-wide programs in the field of mental deficiency. (17 refs.) - *M. G. Conant.*

2 SCHEERENBERGER, RICHARD C. Communication needs and programs in the field of mental retardation. In: *Special Education: Strategies for Educational Progress.* Washington, D. C., The Council for Exceptional Children, 1966, p. 72-75.

The recent emphasis on MR and the unparalleled proliferation of relevant MR literature point to a need for a permanent international network of professionally staffed, automated, communication systems. The minimal intake capacity of these systems should be large enough to include the collection, collation, abstracting and/or coding, and storage of all MR data. Their minimal output capacity should permit the retrieval, assemblage, and interpretation of data in a manner which will provide adequate responses to pertinent inquiries made by professional and lay persons. Output capacity should include a formal publication. Information programs need to be developed in the areas of demography, research, program development, administration, and legislation. (5 refs.) - *J.K. Wyatt.*

3 VAN BOGAERT, L., PETRE-QUADENS, OLGA, & RIBIERE, GERMAINE. Developmental neurology and basic science as an approach to mental retardation. In: Richards, B.W., ed. *Proceedings of the First Congress of the International Association for the Scientific Study of Mental Deficiency*, held September 12-20, 1967, Montpellier, France. Surrey, England, Michael Jackson Publishing, 1968, p. 26-32.

Developmental neurology as a method applied to the study of mental deficiency rests on the role played by the time factor in neurological phenomena and on the relation between maturation and integration. Developmental neurology has been applied to the study of motility, language, and body scheme, and appears to be a science that is basic to the understanding of normal and pathological human growth. For example, paradoxical sleep of normal prepubertal Ss is not significantly different from that of MR prepubertal Ss; however, after puberty, the paradoxical sleep of the MR decreases rapidly and shows wide nightly variations. At the end of pregnancy, the percent of paradoxical sleep of the mother approaches that of the newborn (40% of total sleep), probably due to the increased progesterone level. These waking-sleeping studies can be important in the neurophysiological approach to MR. (No refs.) - *M. G. Conant.*

4 McDOWELL, FLOYD E. Mental retardation program of the National Institute of Mental Health. In: *Special Education: Strategies for Exceptional Children*, 1966, p. 61-65.

The National Institute of Mental Health (NIMH) is specifically responsible for investigating the mental health aspects of MR. Special areas of attention are: the effects of cultural deprivation, those aspects of mental illness related to the life experiences of MRs, and learning. The foci of the NIMH programs are on the biological, psychological, and sociocultural factors in MR. The mental health project grant program provides support for the application of new approaches to the care, management, and training of MRs and for hospital improvement. Other NIMH projects are involved in etiology and treatment research, the study of adaptive behavior, the development of methods of overcoming the intellectual and emotional handicaps that result from early deprivation, the development of a programed curriculum for institutionalized MRs, studies of the legal aspects of MR, and the provision of an occupational day care center with a sheltered workshop and a program for unemployable adult MRs. NIMH personnel training support is available in a variety of fields which either conduct research or provide services in the MR field. The Community Health Centers Program will provide services related to the mental health needs of MRs or will serve as referral sources. (No refs.) - *J.K. Wyatt.*

5 United States. Health, Education, and Welfare Department. *Mental Retardation Activities.* Washington, D.C., U.S. Government Printing Office, 1969, 85p.

The MR activities of the U.S. Department of Health, Education, and Welfare include preventive services, basic

and supportive services, personnel training, research, construction, and income maintenance. These activities are administered by the Health Services and Mental Health Administration, the National Institutes of Health, the Office of Education, the Social and Rehabilitation Service, the Social Security Administration, the Consumer Protection and Environmental Health Service, and the Office of Surplus Property Utilization. The federally administered Vocational Rehabilitation Program provided services for more than 24,000 MRs in 1968, an increase of 6,000 over 1967. The Crippled Children's Program provided medical services for over 20,000 MRs, approximately 2,000 more than were served in 1967. Federally funded special education programs had an enrollment of over 48,000 MR children in 1968. (No refs.) - *K. Janet.*

6 Secretary's Committee on Mental Retardation. *Mental Retardation Activities of the U.S. Department of Health, Education, and Welfare.* Washington, D.C., U.S. Government Printing Office, 1968, 107p.

Highlights of the MR activities of the Department of Health, Education, and Welfare for 1967 include an increase to 150 of the number of MR diagnostic and evaluation clinics supported by the Children's Bureau, the approval of 175 applications for community facilities designed to serve more than 12,000 MRs not currently receiving services, and the rehabilitation of more than 18,000 MRs through the Rehabilitation Services Administration program of grants-in-aid to the states. Summaries of 1967 MR legislation and of the MR activities of the department are included, as well as descriptions of the MR activities of the Public Health Service, the Office of Education, the Social and Rehabilitation Service, the Food and Drug Administration, the Social Security Administration, and the Surplus Property Program. (No refs.) - *J.K. Wyatt.*

7 WORLD HEALTH ORGANIZATION EXPERT COMMITTEE ON MENTAL HEALTH. Services for the mentally retarded. *WHO Chronicle*, 22(10):433-438, 1968.

MR affects 1% to 3% of the world's population and poses a significant problem for agencies concerned with public health, social welfare, and educational services. The optimal approach to the MR patient ought to be in terms of evaluation and improvement of social competency (including work) rather than assignment to one of the confusing classifications based on legal, etiological, psychometric, or clinico-psychological data. Research into causation, both biological and social, and improved case-finding should be expanded and services for management and treatment must keep pace. Genetic counseling must be employed after proper diagnosis is established. Special education and vocational training programs are essential and physicians, nurses, teachers, and general public should be made aware of the special problems of the MR so that each patient may be encouraged to the limits of his capability. (No refs.) - *E.L. Rowan.*

8 NATIONAL SOCIETY FOR MENTALLY HANDICAPPED CHILDREN. *Mental Handicap and the National Society for Mentally Handicapped Children.* Southampton, England, Millbrook Press, 14p. (Price Unknown)

The National Society for Mentally Handicapped Children of Great Britain strives to provide better facilities and counseling for the MR, support research, gain public understanding, and develop MR care in the home community. The society has had a hand in developing: laws to provide care and facilities for the MR; an experimental teacher training college; experimental boarding schools at Slough and Somerset to teach skills and community living to enable the MR to return home; 4 holiday houses to give the MR and his family a vacation from each other; 84 local social clubs aided by the Federation of Gateway Clubs for the MR; and the Institute for Research into Mental Retardation which does research, collects pertinent publications, and disseminates information. The society also operates a trusteeship scheme to look after the MR after the parents have died. (No refs.) - *M. Plessinger.*

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9 NOONE, JOHN J. AAMD–An association in transition. *Education and Training of the Mentally Retarded*, 3(3):135-140, 1968.

Since 1876 the American Association on Mental Deficiency (AAMD) has communicated with its members through publications and meetings and has encouraged and promoted training, research, and programs concerned with MR. The years between the first meeting of the Association of Medical Officers of American Institutions for Idiotic and Feebleminded Persons in 1876 and the ninety-second annual meeting of the AAMD in 1968 have seen changes in attitudes about the MR. The original concept of MR was that "limitations are absolute and permanent." However, the establishment of training classes for the MR in public schools early in this century demonstrated the educational and training potential of the retarded; so the association became concerned with educational psychology. The name of the AAMD was adopted in 1933 and represented an effort to include all aspects of the field of MR. The AAMD conducts an annual meeting, regional meetings, and publishes 2 journals and a *Directory of Residential Facilities.* (4 refs.) - *M.T. Lender.*

10 KAN, O. Some proposals for international statistics on mental retardation. In: Richards, B.W., ed. *Proceedings of the First Congress of the International Association for the Scientific Study of Mental Retardation*, held September 12-20, 1967, Montpellier, France. Surrey, England, Michael Jackson Publishing, 1968, p. 157-161.

Schemes for the gathering of international statistics on the prevalence of MR and on facilities for the care of the MR are proposed, as is a clinical classification of MR. The categories in the clinical classification are: MR following infections; MR following intoxications; MR

following trauma or physical agents; MR associated with disorders of metabolism, growth or nutrition; MR associated with new growths; MR associated with chromosomal abnormalities; MR associated with cerebral malformations, cerebral degenerative diseases, or other organic abnormalities of the brain; MR following psychogenic or environmental influences; MR associated with functional psychosis; and other and unspecified. The prevalence of MR in a country could be estimated by surveying the number of MRs in a determined age group. Information on facilities for the MR could be obtained from reports prepared by the AAMD and sent to participating countries. (No refs.) - *M.G. Conant.*

11 ZAZZO, R. Pour une definition integrative de la debilite mentale: determinants biologiques, criteres sociaux (Towards an integrated definition of mental deficiency: biological determinants and social criteria). In: Richards, B.W., ed. *Proceedings of the First Congress of the International Association for the Scientific Study of Mental Deficiency*, held September 12-20, 1967, Montpellier, France. Surrey, England, Michael Jackson Publishing, 1968, p. 88.

Biological or physiological determinants of MR define deficiency in an absolute manner, while social criteria define the thresholds of adaptation, which vary from one society to another and with age. Integration of these 2 determinants should be made so as to provide a general definition of mental deficiency. (No refs.) - *M. G. Conant.*

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12 DALY, WILLIAM C. In defense of the past. *Training School Bulletin*, 65(3):102-105, 1968.

Evaluation of behavioral retardation should be based on considerations of observed behavior and intellectual level. The current tendency to picture the residential institutions of years past as lethargic and custodial ignores their positive training programs. These programs, for their time, represented considerable progress in the field of MR. Although government financing has recently made many more programs for MRs available, many early institutions were developed as training centers and had many professional persons working on their training programs for many years. Carefully designed systems of research, review, and assessment should be applied to the current behavior modification probes before the findings of these experiments are generalized. (No refs.) - *M. L. Wiltshire.*

A. L. Bowen Children's Center
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13 FAIGEL, HARRIS C. Mentally retarded children. *Clinical Pediatrics*, 7(7):378-379, 1968.

In addition to the 100,000 MR babies born each year, the statistical 3% of the United States' population affected by MR includes children whose IQs are thwarted by personality problems, behavioral disorders, emotional disturbances, and low socioeconomic group disadvantages. The cause of MR in most cases in undetermined. MRs diagnosed as serious are institutionalized. Severity of MR, multiple handicaps, and early institutionalization tend to produce high institutional mortality rates. According to the records at a New York state institution in 1958, the death rates as compared to those of normal children of the same age were 14 times higher for ages 0-5 years, 61 times higher for ages 5-9, and 37 times higher for ages 10-14 years. An institution on the West coast had mortality rates which were 32 times higher than those of the general population for children under 5 years and 175 times higher for ages 5-9 years. Even though home care for the multiply handicapped MR is difficult, all social, psychological, and emotional factors should be considered by the advisor before he recommends institutionalization. (3 refs.) - *J. P. West.*

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14 PASCOE, T.W. *Introductory Handbook on the Severely Subnormal (Mentally Handicapped).* London, England. College of Special Education, 32 p. (Price unknown)

The Mental Health Act of 1959 describes severely subnormal (SSN) as "a state of arrested or incomplete development of mind which includes subnormality of intelligence and is of such a nature or degree that the patient is incapable of living an independent life or guarding himself against serious exploitation or will be so incapable when of an age to do so." Nearly 1/2 of SSN children attending junior training schools suffer from Down's syndrome; identification of the remainder by clinical type is possible only in a minority of cases. At present, there is no cure for MR; the only therapy is education. Since the normal school system is unsuitable, the SSN receive their education at a day school, residential training school, hospital school, or home with a peripatetic teacher. There is no national curriculum and each institution is left to prepare its own training program; however, the programs emphasize the teacher-child relationship and are aimed at building a climate in which the child wants to learn. SSN children are not apt to learn to read, write, or do sums, but most are able to become competent in self-help and care, in social adjustment, and in the ability to make themselves understood. All teachers of the SSN must have the personal qualities necessary for success with such children—patience, understanding, energy, ingenuity, and a sense of humor. Training courses for SSN teachers began on a national level in England in 1936 and have developed greatly since that time. Some questions on SSN teachers are answered and a list of voluntary

organizations directly connected to MR are given. (No refs.) - *B. Parker.*

CONTENTS: The Children; The Schools; The Teachers; The Training Courses; Conditions of Service; and Some Questions Answered.

15 COHEN, S. ALAN. Socially disadvantaged Americans: Slow learners. *Slow Learning Child*, 14(3):153-160, 1968.

Socially disadvantaged children challenge American urban schools with skills problems, such as perceptual dysfunctions, depressed IQ scores, low oral reading scores, and poor visual and auditory discrimination which contribute to "slow learning." The practical knowledge, verbal abstraction ability and reading comprehension displayed by these slow learners show their intelligence potential. The success of university projects and the multiplicity of disabled learners indicate that innovation by dedicated educators must be forthcoming lest these children be denied their rightful place in society. (14 refs.) - *C. Rowan.*

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16 WILLANGER, ROLF, THYGESEN, PAUL, NIELSEN, ROLAND, & PETERSON, OLAF. Intellectual impairment and cerebral atrophy: A psychological, neurological and radiological investigation. *Danish Medical Bulletin*, 15(3):65-93, 1968.

The relationship between intellectual impairment and cerebral atrophy was investigated in a blind study based on the analyses of pneumoencephalographic data and psychological tests on 300 neurological patients from Copenhagen, Denmark. The term cerebral atrophy is defined as its "ordinary clinical neurological meaning." A uniform radiological technique was employed. The ventricular atrophy was graded by combining measures from 4 ventricular sections. Characteristics of the sample included a CA range of 18 to 70, 115 females, 185 males, 3 classifications of work capacity, and 10 clinical neurological categories. About 60% had normal working capacity at time of hospital admission. The psychological assessment included an anamnestic evaluation of premorbid intelligence, an anamnestic investigation of some intellectual and emotional aspects of dementia, tests for intellectual impairment, and specific investigations of brain function. Results showed a high correlation between degree of intellectual impairment and cerebral atrophy which was more apparent for cortical than ventricular atrophy, and closest for the index of combined cerebral atrophy. The variable of age was highly related to atrophy and intellectual impairment. The same degree of impairment was related to more severe impairment in older patients than in younger patients. It may be that the aging process affects the compensatory capacity of intact brain tissue. (85 refs.) - *B. Bradley.*

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17 THOMPSON, RICHARD E. Who are the multiply handicapped deaf children? *Volta Review*, 70(7):569-571, 1968.

Deaf children are "multiply handicapped" when their various disabilities in addition to hearing impairment are considered. These disabilities may be of a social, psychological, learning, and/or communication nature. Their recognition should provide a better understanding of deaf children. Studies of rubella children have made many professionals more aware of the multiple problems of the handicapped deaf child and have led to the conclusion that these children should be seen for a comprehensive diagnostic study very early in life. Early investigation will frequently reveal visual loss, hearing impairment, and heart defects. There is an increasing awareness and recognition that the primary cause of MR in many children is cultural and environmental deprivation, and not birth defect or birth injury. These children have been denied an opportunity to develop to their maximum. The school readiness of every child should be determined. Learning problems which may be due to organic factors or to some delay in development should be identified. The psychological and social problems encountered by a normal child are compounded by deafness. (No refs.) - *S. Half.*

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18 Classification of the neuromuscular disorders. Appendix A to the minutes of the meeting of the research group on neuromuscular diseases, held in Montreal, Canada, September 21, 1967. *Journal of Neurological Science*, 6(1):165-177, 1968.

Classifications of disorders of the lower motor neurone, myoneural junction and voluntary muscle include spinal muscular atrophies and other dysfunctions of anterior horn cells, disorders of motor nerve roots, disorders of peripheral nerves, disorders of neuromuscular transmission, disorders of muscle, and disorders of supraspinal tonal regulation which may mimic neuromuscular disorders. Etiology subgroups designated for each classification include genetically determined, congenital, traumatic (physical and toxic), inflammatory, neoplastic, metabolic neuropathological, and tumor diseases. (No refs.) - *M. G. Conant.*

19 Sindromes de disfuncion cerebral minima (Minimal cerebral dysfunction syndromes). *Boletin Informativo del Instituto Neurologico de Guatemala*, 24(June):1-4, 1968.

The syndrome "minimal cerebral dysfunction" is used to designate certain difficulties in the learning or behavior of children which are associated with defects in perception, conceptualization, language, memory, attention, and control of motor functions. The most common symptoms are: hyperactivity, perception-motor defects, emotional instability, coordination defects, impulsiveness, peculiarities in memory and thought, specific learning problems, speech problems, and EEG irregularities. The medical and psychological evaluation of children with minimal

cerebral dysfunction should include a physical examination, special ear and eye examinations, laboratory tests, psychological tests, academic history, and language formation and education evaluation. (No refs.) - *K. Drossman.*

20 PECKHAM, RALF A. Two "new" disabilities. *Journal of Rehabilitation*, 34(5):14-15, 1968.

With the broad based interpretation of the meaning of "disability" under the 1965 Vocational Rehabilitation Amendments in mind, 2 categories of disabilities--sociogenic retardation and sociogenic neurosis--could be used to include at least 75% of the ghetto unemployed under federal-state rehabilitation programs. These 2 disabilities have definite pathologies, symptoms, and methods of treatment, and can be identified and professionally certified. Sociogenic retardation, a functional retardation with social causes, has many of the same social, educational, and reaction patterns as non-ghetto retardation. Sociogenic neurosis differs from conventional psychoneurosis in that the stress situations of the former are usually a threat to the whole social group and not the result of individual weakness. Two distinct types of sociogenic neurosis emerge: the passive type who depends on others to support him (welfare, relatives, friends, mistresses) and who goes along with riots and looting; and the aggressive type who actively initiates verbal or bodily assault and is a leader in riots. Both types use alcohol and drugs as escape mechanisms and both usually end up in jail--the passive neurotic for less serious and the aggressive neurotic for more serious crimes. Rehabilitation requires total intervention and life re-education. Contact should be made through rehabilitation aides who are members of the ghetto. Rehabilitation progresses through diagnosis, adjustment training in a sheltered workshop, and employment in industry (with the aide's continuing encouragement), to final success in that job or removal for another try elsewhere. (No refs.) - *E. F. MacGregor.*

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21 SIEGEL, ERNEST. Learning disabilities: Substance or shadow. *Exceptional Children*, 34(6):433-438, 1968.

The increased use of the term "learning disabilities" among educators may be due to lack of a better classification for exceptional children or a movement toward an education-oriented viewpoint of diagnosis and treatment. The effectiveness of educational programs set up under this system is impaired by: disagreement among professionals on a definition of "learning disabilities"; lack of realization by educators of the value of the neurologist's continuing involvement and advice on the child's training and education; minimization of the importance of the cause of disability; placement policies which disregard cause of disability in educational grouping; emphasis on learning disabilities at the expense of behavioral aspects; the current passion for testing which encourages inflexibility; and the absence of a universally accepted nomenclature which makes communication more difficult. The primary goal is still a system of teaching based on an understanding of each child's needs. (18 refs.) *E. F. MacGregor.*

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22 TAICHERT, LOUISE. Specific learning disorders: Natural history and current views. *California Medicine*, 109(4):286-290, 1968.

Specific learning disorders ("primary learning disorders" or dyslexias) are genetic in origin but come to play an important role in family dynamics and must be identified and treated by the alert pediatrician. Primary disorders must first be distinguished from those secondary to emotional disturbance or MR. The pediatrician must then correlate other professional disciplines such as psychology, neurology, psychiatry, speech therapy, and special education, and help the family work through its problems of self-blame, hostility, disappointment, confusion, and despair. (20 refs.) - *E. L. Rowan.*

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23 BARSCH, RAY H. Perspectives on learning disabilities: The vectors of a new convergence. *Journal of Learning Disabilities*, 1(1):4-20, 1968.

There is an immediate need to intensify research on learning disabilities and to accurately identify the disabled learner. The treatment of learning disabilities as a concept rather than as a category will offer new dimensions to education. The exploration of divergent views from allied disciplines will bring stabilization and balance to the present nebulous convergent notions about learning disabilities, and will place them in perspective with other world problems. This is a time for research and experimentation with new techniques, the examination of existing methods, and the creation of new models and guidelines with developmental opportunities that will satisfy the needs of the disabled learner. The problem of not knowing clearly who the disabled learner is, makes it difficult to establish a sound curriculum for him. The main types of children with learning disabilities are brain injured children, pupils in the regular classroom who are not progressing in school, and pupils in special education with single or multiple handicapping problems. Disabled learners are not a present day phenomenon; they had their beginnings in medieval times. Succeeding generations have used various labels to describe them, and the various disciplines of human development have helped to identify them and explain their low level of achievement. Since learning disabilities are said to be due to intellectual deficiency, parental neglect, sensory impairment, brain injury, parental instilled anxiety, social disadvantage, physiologic dysfunction, and poor teaching, the components of a model curriculum must

be furnished by specialists from all related fields. (No refs.) - *G. Trakas.*

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24 FOLLIS, PEGGY. Handicapped children: New knowledge of what the future holds. *Journal of the Scottish Society for Mentally Handicapped Children*, 3(2):11-13, 1968.

Our health service today is keeping handicapped children alive much longer. The number of handicapped persons being born can be reduced by genetic counseling and the early testing of infants and the administration of indicated treatment. Safe ways of testing the unborn child are presently being developed in Britain. In all probability more than 1/2 of all children with severe mental impairments are handicapped for genetic reasons. About 1/5 of all stillbirths are due to malformation which has affected the CNS. The Childbirth Research Centre is conducting research on the early detection and diagnosis of congenital anomalies in newborn infants. It is expected that eventually mental impairments caused by chromosome deficiency will be routinely diagnosed in the womb, and the sex of an unborn child will be able to be determined. Additional research is needed on the problems of males with an extra sex chromosome. Although the death rate from inherited conditions has remained essentially unchanged over the past 20 years, the infant mortality rate has shown a marked and significant decline. Future research will permit the practice of prevention in the field of genetics, and perhaps the cure of hereditary defects. (1 ref.) - *S. Half.*

No address

25 BERENBERG, WILLIAM. Cerebral palsy and the engineering sciences. *Developmental Medicine and Child Neurology*, 10(6):695, 1968. (Editorial)

Every effort should be made to use specialized knowledge of individuals in the engineering sciences to prevent handicaps and to make life more tolerable for those already handicapped. Solutions to problems such as nerve deafness and auditory conduction, the development of techniques to monitor physiologic processes, the discovery of a simple method to screen and measure bilirubinemia, designing barrier-free buildings, and improving the design and construction of braces and wheelchairs could be reached much more rapidly if engineering skills were enlisted in improving present techniques. (No refs.) - *E. F. MacGregor.*

26 THELANDER, H.E. Prognosis of children with "cerebral palsy": Reflections on a stock-taking. *Clinical Pediatrics*, 7(5):294-298, 1968.

Children with cerebral palsy originally referred to the special nursery school and/or neurologic diagnostic clinic of a Child Development Center (Children's Hospital of San Francisco) have been followed regularly in order that growth and development might be observed and continuing counseling provided. Ninety-two percent of the 184 children have spastic paralyses of one sort or another and most have retardation of both height and weight (52% below the third percentile). Only 19% have an IQ over 90. Associated physical problems including seizures, visual disturbances, and speech problems add to learning difficulty. The center provides a recreation program for the handicapped and has been quite successful in teaching the MR through play. Unfortunately, communities in general tend to regard all patients with cerebral palsy as "ill" and uneducable. The admittedly small proportion with normal ability rarely reach their full potential and the EMR are not aided at all. (7 refs.) - *E. L. Rowan.*

27 DOYLE, P.J. Medical rehabilitation of the retarded. In: Richards, B.W., ed. *Proceedings of the First Congress of the International Association for the Scientific Study of Mental Deficiency*, held September 12-20, 1967, Montepellier, France. Surrey, England, Michael Jackson Publishing, 1968, p. 125-134.

The MR patient requires early and comprehensive diagnosis by an evaluation team which includes medical specialists (pediatricians, neurologists, and psychiatrists), speech and hearing specialists, and psychologists; emphasis is on early detection of neurological impairments, orthopedic difficulties, and language disorders. The medical management of the MR is discussed with respect to chemotherapy, surgery, psychiatric care, dental treatment, and a rehabilitation program. Ambulation, exercise, physical education, and activities of daily living are stressed. (9 refs.) - *M. G. Conant.*

28 KELLY, ELIZABETH M. ed. *The New and More Open Outlook for the Mentally Retarded.* Washington, D.C., Catholic University of America Press, 1966, 122 p. (Price unknown)

Nine papers which include information about federal legislation, independent thinking, changes in education, innovations in curriculum, emotional disturbances, administration in schools, sheltered work programs, and rehabilitation of the MR are discussed. The professional years (prior to 1945), parent years (1945-1955), congressional years (1955-1960), and presidential years (1961-1966) the 4 important periods of federal legislation for MRs. A curriculum guide which includes social and life functions is needed to improve special class programs. Mental capacity can be changed by the educational environment. Two objectives of curriculum should be to train children to adapt to society and to incorporate social change in their futures. Administration of school programs is done by the state director, state supervisors, and local administrators. A sheltered work program and a school work project promote MRs to independent living. Some of the major barriers for MRs are environmental incongruity, milieu of failure, and inappropriate reinforcers. (21-item bibliog.) - *V. G. Votano.*

CONTENTS: The New and More Open Outlook for the Mentally Retarded; The Impact of Federal Legislation on Development of Comprehensive Progress for the

Mentally Retarded; Fostering Independent, Creative Thinking in Educable Mentally Retarded Children; Influence of Changes in Education on the Mentally Retarded and the Resultant Social Expectancies; Innovations in Curriculum Development for the Mentally Retarded; Emotional Disturbances in Juveniles; The Administration of a School Program for the Mentally Retarded; Sheltered and Cooperative Program for the Mentally Retarded as a Guide to "Independent Living"; Rehabilitation Problems of the Mentally Retarded; Summary of Seminar on Federal Legislation and Realistic Curriculum Planning; Summary of Seminar on Newer Concepts in Mental Retardation; and Summary of Seminar on Rehabilitation.

29 REYNOLDS, MAYNARD C. The new and more open outlook for the mentally retarded. In: Kelly, Elizabeth M., ed. *The New and More Open Outlook for the Mentally Retarded.* Washington, D. C., Catholic University of America Press, 1966, p. vii-xviii.

The research background of the movement toward a more open view of MR includes nature-nurture studies, the psychology of the empty organism, cognitive theories, and changes in the testing movement. Nature-nurture studies include investigations of the developmental effects of adoptive homes and of the provision of intense care for deprived orphans. The empty organism theory is based on the belief that behavior can be changed if responses are carefully defined and the environment controlled to influence the probability of continued response occurrence. Cognitive theories include a recognition of the importance of early experience on intelligence development. Some changes in the testing movement are emphasis on the multiple factors of intellectual ability and the appreciation that non-intellective factors can affect test scores. (13 refs.) - *V. G. Votano.*

30 RUSALEM, HERBERT. Rehabilitation problems of the mentally retarded. In: Kelly, Elizabeth M., ed. *The New and More Open Outlook for the Mentally Retarded.* Washington, D. C., Catholic University of America Press, 1966, p. 88-93.

The major barriers which MRs must face and overcome are environmental incongruity, distorted social perception, a milieu of failure, inappropriate reinforcers, and limited adaptive mechanisms. Habilitation services function in the areas of medicine, education, psychology, social work, and vocation. Good habilitation programs result in independent living for a large number of MRs, institutionalization for a small minority, and a growing acceptance of MRs by society. (No refs.) - *V. G. Votano.*

31 WRIGHT, GEORGE N., & TROTTER, ANN B. *Rehabilitation Research.* Madison, Wisconsin, University of Wisconsin, 1968, 674 p. $14.00.

The 97 rehabilitation studies reviewed pertain to rehabilitation counseling practice, have a research approach, are of national value because of their broad scope, were supported by the Federal Vocational Rehabilitation Administration for a 1- to 5-year period prior to 1966. Projects relating to MR include the development and evaluation of a work adjustment program for MR adolescents, the development of the Vocational Capacity Scale (an instrument to predict the vocational potential of an MR), an investigation of the advancement patterns of EMR adolescents through vocational training in a residential center, the use of measurements of different types of ability among MRs as bases for the assessment of behavioral adequacy, an investigation of the adjustment process in noninstitutionalized EMR adults, and an experimental investigation of the effects of occupational information counseling on the selection of occupational goals by MR and slow learning adolescent males. This book should be of interest to students of rehabilitation, administrators, educators, practitioners, and scientists in rehabilitation and related areas. (38 refs.) - *J. K. Wyatt.*

CONTENTS: Cardiovascular Diseases; Cerebral Palsy; Epilepsy; Mental and Personality Disorders; Mental Retardation; Other Neurological Disorders; Orthopedic Disorders; Respiratory and Pulmonary Disorders; Speech and Hearing Disorders; Visual Disorders; Other Disabling Conditions; Aging and Chronic Illness; Homebound Disabled; Rural Disabled; Workmen's Compensation; Facilities: Workshops and Centers; Evaluation, Prediction, Counseling, and Counselors; Special Studies; Administrative or Program Studies; and Additional Projects in Vocational Rehabilitation.

32 VERMA, SITAPATI KUMAR. Research and rehabilitation projects on mental retardation at Nagpur. *Indian Journal of Mental Retardation,* 1(1):49-52, 1968.

A progress report for the first 2 years of a 5-year project to determine the incidence and prevalence of MR in the non-adult population, the percentage of MRs with a potential for rehabilitation, and the economic and cultural loss due to lack of rehabilitation services in Nagpur (India) revealed that 592 out of 4,696 families served by local maternity hospitals showed a possibility of MR. Follow-up testing for confirmation of MR in these cases is underway. Plans have been made for a 1% sample survey in Nagpur, for examination of "uneducable" and "repeated failure" categories in the elementary and secondary schools, schools for the physically handicapped, and the Beggar's home. Eighty-five persons (IQ 34-75; CA 12-22) are enrolled in pre-vocational and occupational craft training classes which include: cane-work, cloth weaving, newar weaving, book binding, coir work, door mats, sewing, embroidery, knitting, cloth bags, table cloths or frames, fretwork, toy making and painting, cookery, and sanitary pads. Of 46 fully trained workers, 23 now work independently at home, and 23 work independently under supervision. Forty-seven trainees are now gainfully employed although, because of difficult employment conditions in India, only 6 work in competitive employment. A sheltered workshop (soon to be started) will give additional help in preparing workers for outside jobs. (No refs.) - *E. F. MacGregor.*

Nadanvan School for Mentally Retarded
Children
Sitabuldi, Nagpur, India

33 NIRJE, BENGT. The normalization principle and its human management implications. In: Kugel, Robert B., & Wolfensberger, Wolf, eds. ***Changing Patterns in Residential Services for the Mentally Retarded.*** Washington, D.C., President's Committee on Mental Retardation, 1969, Chapter 7, p. 179-195.

The goals and standards involved in working with the MR are embodied in the principle "to let the mentally retarded obtain an existence as close to normal as possible"–an attitude which is also expressed in Swedish law. Normalization refers to: a normal rhythm in the daily activities of dressing, eating, and bedtime; a normal routine of life with various activities such as school, play, and sleep in different locations; a normal rhythm of the year, including holidays and vacations; normal experiences in the life cycle, such as living with a few significant adults as a young child and living with contemporaries as an adolescent and adult; being permitted a choice of leisure time activities and type of vocational training; living in a bi-sexual world; having some financial independence and receiving pay equivalent to the worth of the performance; and living in facilities meeting the same societal standards of size and location used in housing normal individuals. Application of the normalization principle, including integration of the MR into the community in group homes and hostels, leads to better understanding and acceptance of the MR by the public. Employees in a normalized setting gain status and respect. Swedish legislation, based on this principle provides for medical care and mandatory education for the MR. (No refs.) - *A.W. Jordan.*

34 WOLFENSBERGER, WOLF. A new approach to decision-making in human management services. In: Kugel, Robert B., & Wolfensberger, Wolf, eds. ***Changing Patterns in Residential Services for the Mentally Retarded.*** Washington, D.C., President's Committee on Mental Retardation, 1969, Chapter 16, p. 367-381.

Human management agencies are no longer effective mediators between society and the client seeking services because they: find it impossible to cope with the complexity of laws, resources, and record-keeping; make social policy decisions which should be made at a higher level; do not communicate the need for higher level policy decisions and thus render outmoded services; and are increasing in number, while functioning in an uncoordinated fashion. The shortage of manpower in the human services and limited financial resources necessitate the introduction of a cost benefit rationale so that the options offered to a client will be both effective and efficient. A decision making body should be created to determine client eligibility for services, offer a limited number of options to the client, and eventually refer the client to the appropriate agency within its jurisdiction. Options such as a family subsidy or foster care may be more frequently used for the MR, if a cost benefit rationale is employed. (6 refs.) - *A.W. Jordan.*

35 CEGELKA, WALTER J., & THOMAS, PATRICIA A. The culturally disadvantaged: An analysis of the roles of the environment, the child, and the school. ***Training School Bulletin***, 65(2):46-56, 1968.

A review of literature presents solutions for raising low IQs of culturally disadvantaged children. Environment and IQ scores are measurably related. In a study of children of mothers with an average IQ of 49, children staying at home until adolescence had an average IQ of of 53; children separated before age 2 had normal IQs. Migrating rural Negro children's IQs rose in proportion to length of urban residence. Home environment may hamper the development of linguistic abilities. Average and above children can overcome environment, but the school performance of low intelligence children is seriously affected by socioeconomic conditions. Culturally disadvantaged children come from socially, educationally, and economically poor homes which do not provide the cultural tools they need for achievement in society. Criteria which differentiate culturally disadvantaged from non-culturally disadvantaged children include language development, self concept, social skills, and cultural differences. Various studies have found that schools in disadvantaged areas have fewer remedial programs and more inexperienced teachers. Special teacher training programs, such as the one at Hunter College, train teachers to overcome their middle class backgrounds when dealing with culturally disadvantaged children. Preschool research studies show that MRs (CA 3-6) attending nursery schools evidenced an increase in IQ, and that culturally disadvantaged Israeli kindergarteners with the lowest pre-program IQs had the largest post-program IQ gains. Programs should be developed to encourage culturally disadvantaged adolescents to complete high school or college. Financial aid for education can be obtained from work-study programs and from Upward Bound. Counseling and training for disadvantaged youth are provided by Job Corps, Neighborhood Youth Corps, and Volunteers in Service to America. (30 refs.) - *S.L. Markworth.*

School of Education
University of Kansas
Lawrence, Kansas

36 JENSEN, ARTHUR R. How much can we boost IQ and scholastic achievement. ***Harvard Educational Review***, 39(1):1-123, 1969.

If equal educational opportunity is to be achieved, research efforts must be directed toward the determination of the total spectrum of mental abilities. Diverse education, focused on the teaching of specific skills rather than on IQ, recognizes the reality of individual differences, provides educational rewards for children of different ability patterns, and provides for both conceptual learning abilities as measured by intelligence tests and associative learning abilities as observed in disadvantaged children. Compensatory education programs, based on the IQ concept and on the idea that IQ differences are the result of environmental differences coupled with the cultural biases of IQ tests, have failed to produce significant lasting increments in either IQ or school achievement. Studies of the inheritance of intelligence--the degree to which genetic factors account for individual differences in intelligence--suggest that genetic factors play a considerably larger role in the production of IQ differences than do environmental factors and those environmental influences which have the greatest influence on IQ occur during prenatal development. The effects of genetic and environmental factors on

intelligence variations found in different social classes and races indicate that these differences are due to genetic differences; therefore, educational research should be directed toward the exploration of the different types of abilities and modes of learning, the discovery of how these abilities can serve the aims of education, and the development of teaching methods designed to capitalize on the abilities of each child. (149 refs.) - *J.K. Wyatt.*

University of California
Berkeley, California 94721

37 HUNT, J.M. How much can we boost IQ and scholastic achievement? Has compensatory education failed? Has it been attempted? *Harvard Educational Review*, 39(2):278-300, 1969.

The development of intelligence is a function of the cumulative effects of the individual's interaction with physical and social stimuli. However, the effects of biological and social factors cannot be separated easily. Evidence from animal studies of stimulus deprivation and enrichment clearly shows that social stimuli produce biological changes in the organism. Thus, positions which accept a biological psychological dualism, implicitly or explicitly, are untenable. Laboratory research as well as field studies on the effects of early education on intelligence, has shown that development can be accelerated through proper environmental manipulations. While it is true that genetic factors provide a "range of reaction," that range is undoubtedly broad enough to encompass most individuals in most occupations. Of course, research in this area is confounded by the considerable differences in child rearing practices across racial and social class groups. In any event, potential results of early compensatory education programs will not be known for many years. In the meantime, a more sophisticated evaluation method and more appropriate curriculum appear to be necessary if compensatory education is to be a success. (48 refs.) - *J.M. Gardner.*

University of Illinois
Urbana, Illinois

38 KAGAN, JEROME S. How much can we boost IQ and scholastic achievement? Inadequate evidence and illogical conclusions. *Harvard Educational Review*, 39(2):274-277, 1969.

The genetic variables of a population do not set specific levels of mental ability but rather determine a range of intellectual capability. As a consequence of this, genetic variables are likely to be significant for relatively difficult skills, such as creative music, but not for relatively simple self care and social skills like reading, and writing. Observed differences on IQ tests between racial and social class groups can be ascribed in large part to environmental variables. Recent research at Harvard indicates significant differences between lower and middle class white children in mother-child relationships, in that the middle class white children experience a qualitatively richer environment. In addition, a recent study of the effects of tester-testee rapport demonstrates that lower class Ss may perform poorly because they do not understand the nature of the task. Extensive rapport building eliminated many differences in performance between social classes. While there is evidence that genetically similar people have more similar IQ scores, appreciable differences nonetheless exist. There is evidence that differences between twins reared in different environments are larger than average differences between black and white populations. In the light of these facts, there is a clear need to effectively evaluate compensatory education programs which attempt to increase IQ and scholastic achievement through environmental manipulation. (2 refs.) - *J.M. Gardner.*

Harvard University
Cambridge, Massachusetts

39 CROW, JAMES F. How much can we boost IQ and scholastic achievement? Genetic theories and influences: Comments on the value of diversity. *Harvard Educational Review*, 39(2):301-309, 1969.

Hereditability (H^2) refers to the ratio of the genetic variance to the total or phenotypic variance, where the total variance (V_P) can be analyzed into genetic (V_H), environmental (V_E), interaction and error fractions. Thus, $H^2 = V_H/V_E$ and $V_P = V_H + V_E$ + interaction and error. While much evidence indicates that H^2 is quite large (averaging about .80) in determining intelligence, there are limitations to the usefulness of the concept of hereditability. H^2 provides little information as to increases in IQ which would be gained through a genetic program of selective breeding, provides little information on IQ gains obtained through environmental changes, and can be radically altered such as in cases where cures are found for hereditary diseases. Because hereditability studies have almost exclusively been confined to white Ss in normal environments, generalizations to other racial and social groups in other environments cannot be made. There is no question that genetic differences between individuals exist–the goal of a democratic society should be to provide educational opportunities so that each individual maximizes his potential. (No refs.) - *J.M. Gardner.*

University of Wisconsin
Madison, Wisconsin 53706

40 BEREITER, CARL. How much can we boost IQ and scholastic achievement? The future of individual differences. *Harvard Educational Review*, 39(2):310-318, 1969.

It is clear that a great deal of the variance in intelligence is due to genetic differences. The trend toward increasing complexity in Western societies will undoubtedly lead to increases in individual differences due almost entirely to heredity. As environmental variables such as nutrition, health care, and educational practices are adjusted so that each child realizes his full potential, differences in performance will be due solely to differences in heredity. The increasing use of sophisticated tools amplifies rather than equalizes differences. They create a wedge between the people

who can use them effectively and those who cannot. One possible solution is to discover cognitive behaviors which might never be learned under ordinary circumstances. (13 refs.) - *J.M. Gardner.*

No address

41 ELKIND, DAVID. How much can we boost IQ and scholastic achievement? Piagetian and psychometric conceptions of intelligence. *Harvard Educational Review*, 39(2):319-337, 1969.

In regard to the nature of intelligence, psychometric and Genevan schools have many similarities as well as differences. Both agree upon the importance of genetics and the significance of maturation; however, the psychometrician emphasizes inter-individual differences, while Piaget is concerned with intra-individual variations. In addition, both employ a "non-experimental" methodology. The psychometric school chooses to study changes in the quantity of intelligence while the Genevan school is more concerned with qualitative changes, as exemplified in their concern with developmental stages. Both schools emphasize the essentially rational nature of intellectual functioning. In terms of the importance of preschool instruction, there have been no positive or negative demonstrations of long term gains; nevertheless, this need not deter the utility of preschool instruction as an immediate source of gain for parent and child. Concern for preschool education should not detract from what is conceivably a more important realm--elementary education. (36 refs.) - *J.M. Gardner.*

University of Rochester
Rochester, New York 14627

42 CRONBACH, LEE J. How much can we boost IQ and scholastic achievement? Heredity, environment, and educational policy. *Harvard Educational Review*, 39(2):338-347, 1969.

Concern with the effectiveness of early education intervention projects has raised the argument between hereditary and environment as causal agents. It appears that both geneticists and environmentalists have misdirected their zeal. Environments are neither good nor bad, and genetic factors with survival value in one environment are detrimental in another. Highly stimulating environments can be helpful or harmful depending on the child. Recent emphasis on the importance of genetic factors refers to hereditability. Hereditability describes the genetic variance for a certain population having a certain gene pool in a certain environment. No limits can be implied concerning the effects of environmental manipulations, since mutant environments often produce dramatic changes as in the case of PKU. In addition, there is a need to clarify the concepts of covariance and interaction between heredity and environment. Covariance exists when individuals of a given genotype experience a non-random selection of environments, while interaction refers to the differential effects of given treatments on individuals of different genotypes. The severe stimulus deprivation in homes of black slum children is an example of the covariance of heredity and environment. The recognition of individual differences which can be attributed to either heredity or environment points out a need for new kinds of instruction to fit these diverse patterns of abilities. (15 refs.) - *J.M. Gardner.*

Stanford University
Stanford, California 94304

43 BRAZZIEL, WILLIAM F. How much can we boost IQ and scholastic achievement? A letter from the South. *Harvard Educational Review*, 39(2):348-356, 1969.

Since psychological research is not independent of social issues, the reporting of results from psychological studies must consider social implications. Moreover, concern must be directed toward the possible misuse of information by biased interest groups. What is required, therefore, is a careful consideration of both the nature and the implications of the research. Reports of the possible hereditary differences (and by implication, inferiority) between racial groups can conceivably be used to block efforts designed to eradicate the inequalities which the studies report. Research to date on differences between black and white populations has suffered from numerous and diverse deficiencies including the ignoring of the undoubtedly high racial mixture, particularly among blacks in the population; the effects of nutritional handicaps, environmental deprivation, and social pressures. In addition to dealing with these methodological problems, future research might be directed at the study of a broad range of ethnic groups. (No refs.) - *J.M. Gardner.*

Virginia State College
Petersburg, Virginia 23803

44 PREHM, HERBERT J., HAMERLYNCK, LEO A., & CROSSON, JAMES E., eds. *Behavioral Research in Mental Retardation.* Eugene, Oregon, University of Oregon, (Rehabilitation Research and Training Center in Mental Retardation, Monograph No. 1), 1968, 126 p. (Price unknown)

Important behavioral research with the MR is reported by leading researchers in the field. The major content areas explored by the various authors include personality, verbal learning, the environment-heredity controversy, and sociological and anthropological research. Cogent comments by leading authorities in the respective fields are included. (213 refs.) - *J.M. Gardner.*

CONTENTS: The influence of environmental and genetic variables on intellectual development (Heber, Dever, & Conry); Comments (Albizu-Miranda & Matlin); Rote verbal learning and memory in the retarded (Prehm); Comments (Keppel); Personality characteristics of the mentally retarded: Review and critique (Gardner); Comments (Cromwell); Anthropology and mental retardation: A plea for the comparative study of incompetence (Edgerton); Comments (Boggs); Sociological research in mental

retardation (Farber); Comments (Hamerlynck, Mullenix, & Perlin); Federal support in mental retardation: The Vocational Rehabilitation Administration (Seidenfeld); and Mental retardation research within the context of human development (Tjossem).

45 HEBER, RICK, DEVER, RICHARD, & CONRY, JULIANNE. The influence of environmental and genetic variables on intellectual development. In: Prehm, Herbert J., Hamerlynck, Leo A., & Crosson, James E., eds. *Behavioral Research in Mental Retardation.* Eugene, Oregon, University of Oregon, (Rehabilitation Research and Training Center in Mental Retardation, Monograph No. 1), 1968, p. 1-22.

Definitions of MR have historically emphasized heredity or environment. Research on the etiology of MR comes from 3 major areas--distribution of intelligence among various groups, observation of intellectual development of children reared in various environments, and manipulation of the environment and its effect on intelligence. Studies of intelligence in family, racial, and socioeconomic groups, indicate that intelligence is lower in large, low-socioeconomic, non-white families. Twin studies have shown that identical twins reared apart are more alike than their natural siblings. Studies of the effects of foster homes have emphasized the environment as a prime determinant. However, weaknesses in experimental design limit any generalizations which can be drawn from these data. Studies which manipulate the environment have shown that increases in intelligence can result from early intervention, although the long term gains remain to be determined. Moreover, all the evidence can be used for or against the hereditary or environmental position. A re-orientation is needed. Instead of examining the effects of different environments, it should be possible to take a group of Ss who have a high probability of becoming retarded (poor, large, black, ghetto families), intervene at an early age with one group, and attempt to prevent the development of retardation. Such an approach would indicate the relative contributions of heredity and environment, at least in the case of cultural-familial MR. (21 refs.) - *J.M. Gardner.*

46 ALBIZU-MIRANDA, CARLOS, & MATLIN, NORMAN. Comments on: The influence of environmental and genetic variables on intellectual development by Heber, Dever, & Conry. In: Prehm, Herbert J., Hamerlynch, Leo A., & Crosson, James E., eds. *Behavioral Research in Mental Retardation.* Eugene, Oregon, University of Oregon, (Rehabilitation Research and Training Center in Mental Retardation, Monograph No. 1), 1968, p. 23-30.

Causes of MR have traditionally been viewed along the heredity-environment dichotomy. Heredity was prominent in the early part of the twentieth century but has declined in recent years, partly due to the political and economic realities of gene alteration and to Hitler's influence on eugenic practices. Environmental emphases are currently focused on cultural deprivation. Both arguments, heredity and environment, neglect a third major factor--personality. An individual's behavior, now or in the future, can be said to be an interaction between his predispositions (heredity), his background (environment), and his decision-making processes (personality). It is important to consider a person's potential environments and to consider the environment he chooses in the light of his personality. (No refs.) - *J.M. Gardner.*

47 EDGERTON, ROBERT B. Anthropology and mental retardation: A plea for the comparative study of incompetence. In: Prehm, Herbert J., Hamerlynck, Leo A., & Crosson, James E., eds. *Behavioral Research in Mental Retardation.* Eugene, Oregon. University of Oregon, (Rehabilitation Research and Training Center in Mental Retardation Monograph No. 1), 1968, p. 75-87.

Although anthropology has traditionally ignored the study of the MR, an anthropological approach to MR could provide important data concerning social competence across different cultures. All societies make demands upon their members; many of these demands require intellectual skills including interpersonal relations, economics, and religious practices. While it is generally accepted that the severely and profoundly MR would be recognized in any society, a common belief is that the mildly retarded in our society would be normal in a more primitive society. This hypothesis could be tested through anthropological research. (18 refs.) - *J.M. Gardner.*

48 BOGGS, STEPHEN T. Comments on: Anthropology and mental retardation: A plea for the comparative study of incompetence by Edgerton. In: Prehm, Herbert J., Hamerlynck, Leo A., & Crosson, James E., eds. *Behavioral Research in Mental Retardation.* Eugene, Oregon. University of Oregon, (Rehabilitation Research and Training Center in Mental Retardation Monograph No. 1), 1968, p. 88-92.

Increasing evidence suggests that cognitive functioning is very similar across different cultures. This means that deficits in verbal or quantitative functioning demonstrated in this society might apply to other cultures. One implication is that, if social competence is a pancultural phenomenon, cultural adaptation as a treatment possibility would be eliminated. On the other hand, if this is not the case, the anthropological study of social competence might suggest possible areas of cultural change which are applicable to the treatment of the retarded. (No refs.) - *J.M. Gardner.*

49 FARBER, BERNARD. Sociological research in mental retardation. In: Prehm, Herbert J., Hamerlynck, Leo A., & Crosson, James E., eds. *Behavioral Research in Mental Retardation.* Eugene, Oregon, University of Oregon (Rehabilitation Research and Training Center in Mental Retardation Monograph No. 1), 1968, p. 93-109.

Sociological research in MR can broaden our knowledge of the retarded as well as of society in general. Areas of concern have been the social contexts of role failure, labeling and social stratification among families of the SMR, and organizational dynamics in parent associations for the retarded. The significance of role failure is dependent on the social context in which the

failure occurs. The cause can be ascribed to either deviance or incompetence. Deviance emphasizes qualitative differences between retarded and normal behavior and can have threatening connotations; while incompetence stresses a person's relative inability to perform. Sociological research indicates that families of SMR children tend to have their upward social mobility impeded. Additional areas of study have included the effects of institutionalization, sibling relationships, and socioeconomic status. In each case, the effects of labeling should provide a fruitful area of study. (27 refs.) - *J.M. Gardner.*

50 HAMERLYNCK, LEO A., MULLENIX, GORDON, & PERLIN, ARTHUR. Comments on: Sociological research in mental retardation by Farber. In: Prehm, Herbert J., Hamerlynk, Leo A., & Crosson, James E., eds. *Behavioral Research in Mental Retardation.* Eugene, Oregon. University of Oregon, (Rehabilitation Research and Training Center in Mental Retardation Monograph No. 1), 1968, p. 110-114.

Sociological research in MR attempts to add to the knowledge of the structure and functioning of society by studying the retarded, while research on the social aspects of MR is more concerned with clinical applicability to the retarded. The extensive use of questionnaires in sociological research has seriously limited the usefulness of the data. Areas of potential significance, however, appear to be the effects of automation on leisure time, comparative urban-rural sociology, and family relations. While research on the social aspects of MR has concentrated on the effect of a retarded child on the family, the nature of the variables under study need to be specified more clearly. Areas open to question include the real and apparent differences in life styles and motivational systems between upper and lower class persons, and the question of social class membership. Careful delineation of these variables would increase greatly the value of the research. (8 refs.) - *J.M. Gardner.*

51 SEIDENFELD, MORTON A. Federal support of research in mental retardation: The vocational rehabilitation administration. In: Prehm, Herbert J., Hamerlynck, Leo A., & Crosson, James E., eds. *Behavioral Research in Mental Retardation.* Eugene, Oregon, University of Oregon, (Rehabilitation Research and Training Center in Mental Retardation Monograph No. 1), 1968, p. 115-121.

The objective of the Vocational Rehabilitation Administration (VRA) is to assist every individual with a recognized disability to maximize his physical, emotional, or social effectiveness to the point of vocational independence or relative independence. Training and research are identical in achieving this goal, and little distinction is made between "pure" and "applied" research. Due to financial limitations, VRA can support only research which is directly or indirectly related to the provision of more and better rehabilitation. There are also some limited funds available for construction purposes, particularly in the workshop areas. Projects that do not meet these criteria are often referred to other federal sources. One central problem which VRA and other federal agencies face is technical utilization--making use of the knowledge and resources currently available. (No refs.) - *J.M. Gardner.*

52 TJOSSEM, T.D. Federal support of research in mental retardation: Mental retardation research within the context of human development. In: Prehm, Herbert J., Hamerlynck, Leo A., & Crosson, James E., eds. *Behavioral Research in Mental Retardation.* Eugene, Oregon, University of Oregon, (Rehabilitation Research and Training Center in Mental Retardation Monograph No. 1), 1968, p. 122-125.

The National Institute of Child Health and Human Development (NICHHD) is devoted to studies of human development, normal and deviant, through the entire life span. Organizationally, it consists of the Intramural and the Extramural Research Program. The Intramural Research Program includes the Laboratory of Biomedical Sciences, the Behavioral Biology Branch, and the Children's Diagnostic and Study Branch. The Extramural Research Program consists of the Reproduction and Population Research Branch, the Perinatal Biology and Infant Mortality Research Branch, the Growth and Development Research Branch, the Adult Development and Aging Branch, and the MR Branch. The Intramural Research Program carries out a wide range of activities specifically directed toward research in MR; the Extramural Research Program is concerned with the broader areas of biological, behavioral, and social sciences. NICHHD is also jointly responsible for the operation of MR research centers and is concerned with university-affiliated facilities for the MR. (No refs.) - *J.M. Gardner.*

53 CHEEK, DONALD B., ed. *Human Growth: Body Composition, Cell Growth, Energy, and Intelligence.* Philadelphia, Pennsylvania, Lea & Febiger, 1968, 781 p. $25.00.

The emphases of these multidisciplinary investigations of growth in children are on growth in size, functional achievement, and time or biologic age; and on the analyses of these growth dimensions at the whole body, tissue, and cellular levels. Most of the studies were conducted at the Johns Hopkins Hospital, Baltimore, Maryland, and represent comprehensive data on the same group of children from multiple disciplines. Growth is defined as the physiologic accretion of new tissue as reflected by water and protein acquisition. Growth in normal children from age 5 years through sexual maturity is emphasized; however, diseases (such as, hypopituitarism or cretinism, acquired hypothyroidism, Turner's syndrome, and congenital heart disease) in which growth retardation is blatant, and comparisons of diseased children and their normal siblings are included. Pediatricians, pathologists, radiologists, biostatisticians, orthopedic surgeons, psychologists, psychiatrists, biochemists, neuropathologists, special educators, and cardiologists should be interested in these data on changes in body composition and cell mass; variations in energy and metabolism; the relationships between height and weight during growth; changes in the size, number, and function of muscle cells; and intelligence in relation to somatic growth retardation. (1122 refs.) - *J.K. Wyatt.*

CONTENTS: General Introduction; Etiologic Factors; Clinical and Anthropometric Approach to Growth; Body Size and Composition: Laboratory Approach; Cellular Growth; Energy Metabolism; Biologic Age: Cerebral Function and Physiologic Growth; and Methods for Studying Body Composition.

54 CHEEK, DONALD B. Conclusions and future implications. In: Cheek, Donald B., ed. *Human Growth: Body Composition, Cell Growth, Energy, and Intelligence.* Philadelphia, Pennsylvania, Lea & Febiger, 1968, Chapter 43, p. 616-645.

Research on the growth dimensions of size, function, and maturation in children 5 to 17 years old indicates that intrauterine and postnatal factors can interfere with cell growth and lead to growth retardation which is a failure of protein or RNA synthesis or cell multiplication. Agents that appear to interfere with DNA and protein accretion during intrauterine life include viruses, toxins, radiation, chemicals, and hormones. Chromosomal aberrations may also play a part. Postnatal factors which affect DNA synthesis are lack of enzymes, lack of growth hormone, cortical excess, sympathetic overactivity, testesterone deficiency, and conditions that reduce available energy. Postnatal protein synthesis is affected by reduced protein intake, protein loss, impaired amino acid transport to cells, cell lack, and abnormal ratios of amino acids. Studies of the relationship between nutrition, growth, and ageing, indicate that overnutrition may accelerate growth and cause children to reach a steady state of cell population at an earlier age. If this point is time dependent, maximal growth would not be synonymous with optimal growth, and degenerative disease might be anticipated at an earlier age. (63 refs.) - *J.K. Wyatt.*

55 LILLYWHITE, HEROLD S., & BRADLEY, DORIS P. *Communication Problems in Mental Retardation: Diagnosis and Management.* New York, New York; Harper & Row, 1969, 196 p. $5.95.

Because of the multifaceted nature of MR, communication specialists should: be specialists in multihandicaps and related disciplines; participate as team members in diagnostic, educational, and remedial situations; and develop a multidisciplinary approach to MR. In addition to exhibiting the same kinds of speech, language, and learning problems found in normals, MRs evidence delay factors related to the amount of retardation and to a number of other factors peculiar to multihandicapped persons. The function of the speech pathologist in the team situation is to provide a description of speech and language skills which, in combination with information provided by the other disciplines, allows for a disgnosis of MR and for a differential diagnosis of the specific communication problems of the individual. Speech and hearing specialists engaged in the complicated task of managing the communication problems of MR children should have initiative, creativity, patience, and a high degree of competence. They should be able to suggest to physical and occupational therapists, psychologists, social workers, parents, and classroom teachers many of the tasks involved in the development of an MR child's communication skills. The broad concept of MR adopted by university-affiliated MR centers should have a profound effect on the future of the speech and hearing profession in that these centers will offer extensive diagnostic and treatment facilities, rehabilitation training opportunities, and a tremendous potential for research. This book should be of interest to speech pathologists, audiologists and teachers of the MR. (95-item bibliog.) - *J. K. Wyatt.*

CONTENTS: Background; Etiological Factors and General Characteristics; Diagnosis of Mental Retardation; Medical-Dental Management of the Retarded Child; Educational Management; Diagnosis of Communication Disorders; Therapy Procedures for Communication Disorders; and Summary and Notes on Trends for the Future.

56 KAGIN, EDWIN F. Literature and mental retardation. *Project News of the Parsons State Hospital and Training Center*, 4(8):3-7, 1968.

In the world of art and literature the role of the MR has changed greatly. In modern books, the MR is portrayed as a person--defective, but human--rather than as an object of scorn and derision. Not only has the reaction of the world to MR changed, but, with more advanced techniques of teaching, the MR person himself has changed. Books written by MRs have been published which show real creativity and vivid expression. A study of literature by and about the retarded could be very enlightening. (No refs.) - *E.F. MacGregor.*

57 JEFFERY, C.R. *Criminal Responsibility and Mental Disease.* Springfield, Illinois, Charles C. Thomas, 1967, 324 p. $11.00.

A group of Washington, D.C. area lawyers (26) and psychiatrists (36) were surveyed as to their feelings about the insanity defense in criminal procedures after the Durham decision which held that, if the criminal act were a product of mental illness, the criminal was not responsible for the act. Most psychiatrists still considered "insanity" equivalent to "psychosis" although the decision allows more latitude than this. Both groups were concerned about the lack of adequate medical facilities for patients committed as "insane" and the difficulty in obtaining a release once such a commitment was made. Transcripts of actual cases indicate that courtroom testimony suffers from an attempt to analyze behavior from 1 environment in the context of verbal responses given in the very different environment of psychiatric interviews and psychological tests. If behavior is defined as a mental process, then it is treated as a disease with the psychotherapeutic model - a process with no proven success or validity. "Mental illness" has never been defined in terms which can be experimentally associated with crime; rather, sociological and experimental data suggest that criminal behavior is learned in a certain type of environment. A test of criminal intent based on the environmental conditions surrounding the act could be devised, for it is a rare criminal indeed who does not intend to commit crime. This provocative volume will be of interest to psychiatrists, behavioral scientists, lawyers, and judges. (216 refs.) - *E.L. Rowan.*

CONTENTS: Criminal Intent and Insanity; Research Procedure; Mental Disease and the Courts; Crime, Mental Disease, and Causation; United States vs. Kent; United States vs. Jenkins; Cases of Personality Disorders; Release Procedures; Clinical Method; Kent and Jenkins Revisited; Mental Disease: What is it?; Does Mental Illness Cause Crime?; Alternate Theories of Behavior; Conclusions.

58 RESEARCH UNIT. *Directory of Institutions for the Mentally Retarded in India.* Chandigarh, India, The Children's Club, Government Institute of Special Education, 1967, 28 p.

A directory of 45 institutions serving the MR in India is presented. The institutions are listed alphabetically by location and the information given includes the director's name, the available staff, management (whether public or private), capacity, eligibility, facilities available, fees, services, area served, and the teaching language. (No refs.) - *M. Drossman.*

59 TURNER, ALBERTA B., ed. *Directory of Schools, Agencies and Institutions for Children with Special Needs.* Columbus, Ohio, Ohio Youth Commission, 1968, 383 p.

A directory of agencies in Ohio which deal with children with special needs is presented. The listings include residential, non-residential, and out-patient facilities arranged in alphabetical order. In addition, several indices in the back of the directory include agencies listed according to type of school or type of problem child. (No refs.) - *M. Drossman.*

60 CALIFORNIA. MENTAL HYGIENE DEPARTMENT. *Private Institutions Licensed by Department of Mental Hygiene.* Sacramento, California, 1969, 62 p.

A listing of private agencies licensed by the State of California including facilities for alcoholics, MR, emotionally disturbed, and psychiatric patients is presented. The agencies are listed alphabetically under county and city and information is presented on type of patient, rates, licensing data, type of facility, capacity, and location. In addition, a separate listing is given with the facilities arranged according to type of patient served. (No refs.) - *M. Drossman.*

61 COMMISSION ON YOUTH GUIDANCE. Directory of Services to the Retarded: State of of Tennessee. *Mind over Matter,* 13(4):21-71, 1968.

A directory of services available in Tennessee for the MR and his family is presented. The listings include state agencies, half-way houses, day care, information and referral services, residential services, speech and hearing programs, and workshops. This is the first effort at a comprehensive compilation of services to MRs in Tennessee and is designed for professional and lay groups as well as affected families. (No refs.) - *M. Drossman.*

62 INFORMATION, EDUCATION AND REFERRAL SERVICE FOR MENTAL RETARDATION. *A Directory of Facilities and Services in Texas for the Diagnosis and Evaluation of Mental Retardation.* Austin, Texas, Texas Mental Health and Mental Retardation Department, 1968, 215 p.

A directory of schools and diagnostic and evaluation centers for the MR in Texas is presented. The directory is divided into 10 sections conforming to regions in Texas and includes county and state schools, as well as city facilities. (No refs.) - *M. Drossman.*

63 TRI-STATE COMPREHENSIVE PLANNING AND IMPLEMENTATION PROJECT FOR MENTAL RETARDATION. *Directory of Services Available to the Mentally Retarded 1969.* Cincinnati, Ohio, Tri-State Mental Retardation Project, 1969, 63 p.

A directory of agencies for the MR listed by state (Indiana, Kentucky, and Ohio) and including the counties immediately around the Cincinnati area is presented. Many of the services are available across state lines. Information about each agency includes: area served, services rendered, application procedure, ages served, and any other requirements as well as addresses and phone numbers. (No refs.) - *M. Drossman.*

MEDICAL ASPECTS—DIAGNOSIS (GENERAL)

64 PENROSE, L.S. Dermatoglyphics and mental retardation. In: Richards, B.W., ed. *Proceedings of the First Congress of the International Association for the Scientific Study of Mental Deficiency,* held September 12-20, 1967, Montpellier, France. Surrey, England, Michael Jackson Publishing, 1968, p. 46-55.

Studies of aberrant dermatoglyphic patterns can be useful for classical genetic research as well as for clinical diagnosis; however, there is little evidence that the distortions are produced directly by gene action. The lack of complete agreement among identical twins shows that environmental or fortuitous effects are significant. Distorted dermal patterns can be caused by a variety of disturbances: genes which specifically affect the anatomy of the hands and feet, dysplasias associated with chromosomal aberrations, and toxic effects on the fetus. Dermatoglyphic study is relevant to MR as defect

of growth in early life can be associated with defects of cerebral development, although the association is by no means perfect. (31 refs.) - *M.G. Conant.*

65 HOLT, SARAH B. *The Genetics of Dermal Ridges.* Springfield, Illinois, Charles C. Thomas, 1968, 195 p. $15.95.

The field of dermatoglyphics in the investigation of human genetics has become increasingly important and as a science has reached a point where its usefulness in medical diagnosis is an accepted fact. The hand has always had great diagnostic value; nail growth, bone structure, and skin color have been used by physicians for many years. Now, fingerprints, palm, and sole print ridge counts can reveal characteristics of particular chromosomal aberrations. Dermal patterns include arches, loops, and whorls, according to the number of triradii present; however, pattern combinations and frequencies are more significant than pattern types. Flexion creases, the large lines in the palm and sole are not dermal ridges but are formed embryonically at the same time. Dermal ridges are useful in investigations on human biology because: they are not affected by age once they are formed in the third fetal month; they are not affected by environment except for scarring; individual ridges are extremely variable; and patterns can be classified into main types, some found in normal individuals, others only in abnormal states. Ridge arrangements may differ from hand to hand or finger to finger and there are also sex and race differences. Quantitative measures of ridge counts are used to determine family resemblance, parent-child correlation, sib correlations, in twin diagnosis, and in diagnosis of inherited disorders such as mongolism, trisomic syndromes, chromosomal translocations, Turner's syndrome, and others. This book should interest pediatricians, geneticists, and investigators of human biology in all fields. (204 refs.) - *K. Drossman.*

CONTENTS: Ridged Skin; Ridge Arrangements on Palms, Fingers, Soles and Toes; Sex Differences and Racial Variation; Finger Ridge-count; Finger Ridge-count Distribution; The Inheritance of Total Finger Ridge-count; The Diversity of Ridge-count From Finger to Finger; The Use of Finger Ridge-count in Twin Diagnosis; Quantitative Genetics of Palmar and Plantar Ridge Configurations; Dermatoglyphics of Inherited Malformations Involving Hands and Feet; Distortions in Dermal Ridge Arrangement in Malformations Caused by Autosomal Aberration; Quantitative Investigations on the Dermatoglyphics of Mongols and Their Relatives; Distortions of Dermal Ridge Arrangement in Patients with Sex Chromosomal Aberrations; and Problems of Gene Location.

66 NADLER, HENRY L. Antenatal detection of hereditary disorders. *Pediatrics*, 42(6):912-918, 1024, 1968.

Cytogenetic and biochemical analysis of amniotic fluid cells is an aid to genetic counseling and management of individual pregnancies. Amniotic cells were obtained for culture by amniocentesis during the first trimester, either using the transabdominal approach, or obtaining amniotic fluid at the time of Caesarian section or therapeutic abortion. There was a high correlation of specific biochemical and cytogenetic defects in cells obtained from intrauterine amniocentesis when compared to those obtained later in the same pregnancies by abortion or from full-term neonates. The technique gives precision to genetic counseling. It may be safely performed with ease at 16 weeks of gestation. Familiarity with qualitative and quantitative differences in enzyme patterns and their variance with the period of gestation is essential to proper interpretation. The prenatal approach to the treatment of biochemical and cytogenetic defects is recommended and is of specific value in obstetrical management where therapeutic abortion is considered. (23 refs.) - *L.E. Clark.*

Children's Memorial Hospital
2300 Children's Plaza
Chicago, Illinois 60614

67 CRITCHLEY, E.M.R. The neurological examination of neonates. *Journal of the Neurological Sciences*, 7(3):427-435, 1968.

Neurological reflexes in 600 neonates (77% at term, 6% postmature, and 17% premature) were examined during the first 4 days of life. An APGAR score below 7 was found with 15% of the children and 8% were clinically abnormal, as a result of respiratory distress, neonatal convulsions, presence of extra digits, obstructive jaundice, toxoplasmosis, hydrocephalus, or Down's syndrome. The biceps reflex was obtained in 89% of the infants, triceps jerk in 85%, supinator jerk in 87%, knee and ankle jerk in 99%, anal reflex in 98%, and corneal reflex in 99%. Seventeen babies showed a flexor plantar response with lateral plantar stimulation, with the response occurring in a pathological setting in 2 children (1 showed athetoid movements at 9 mos of age and the other was areflexic and atonic at birth). Abdominal reflexes were obtained in 98% of the babies when these responses were tested immediately after the initial inspection. Pronounced tonal fluctuation observed after the first 6 hours of life probably is due to a delayed postpartum transition. Statistically significant mean differences between head circumference and chest circumference of 1.55 cm for full-term infants, 2.2 cm for premature, and 3.6 cm for "small for dates" infants were found. (26 refs.) - *M.G. Conant.*

North Lancashire Neurological Centre
Preston Royal Infirmary
Preston, Lancashire, Great Britain

68 DARGASSIES, S. SAINT-ANNE. Semiologie Neurologique d'alarme au cours de la premiere annee de vie (Alarming neurological symptoms in the course of the first year of life). *La Medecine Infantile*, 75(4):261-268, 1968.

The criteria of normal growth and development should be observed carefully in infants during the first 12 months of life in order to discover MR at an early age. The signs of normality during the first 10 days of life are good muscle tone, flexion, awake activities, crying, and the 6 primary reflexes. The pathological signs are hypoactivity, ocular troubles, non-alertness, poor tonus, and poor sense development. From 10 days to 3 months the infant should show psychological development, the

disappearance of the primary reflexes, and the beginnings of axis control. The child from 4 to 6 months should develop strength, prehension, and the rudiments of sitting and standing. Further development of all aspects should take place during the 7 to 9 month period, as well as voice development, and the 10 to 12 month period should see further leg and arm development, standing, reaching, foot-hand synergism, and throwing. A lack of the expected coordination or development during any of the time periods indicates the possibility of MR. (No refs.) - *M.T. Lender.*

Centre de Recherche neo-natale de
l'Association Claude-Bernard
121, Boulevard Port-Royal
Paris, 14e ,France

69 GAMSTORP, INGRID. Polyneuropathy in childhood. *Acta Paediatrica Scandinavica*, 57(3):230-238, 1968.

Impaired peripheral nerve function was found in 43 children (CA less than 17 yrs) in Lund (Sweden) and Chicago (Illinois). Both central nervous system and peripheral involvement were found in 13 patients. Of the remaining 29 Ss with peripheral neuropathy, there were 2 groups: those with diabetes mellitis and those with chronic hereditary polyneuropathy. Diagnostic methods consisted of measurement of nerve conduction velocities and neurological examinations. Because of a more favorable prognosis in polyneuropathy without central nervous system involvement, treatment should include an optimistic attitude, intense physical therapy, and orthopedic measures. (38 refs.) - *W. Asher.*

University of Lund
Lund, Sweden

70 BEINTEMA, DAVID J. *A Neurological Study of Newborn Infants.* London, England, Spastics International Medical Publications, 1968, 178 p. $4.80.

Although early assessment of nervous system function is essential for the early detection of severe brain damage, the results of infant neurological examinations conducted on the second or third days of life are less valid than those obtained on later days during the neonatal period. Three hundred and sixty-four separate and complete neurological examinations were given to 49 full-term infants during the first 9 days after birth. The sample consisted of a fetal distress subgroup (21 Ss), an "obstetrical complications" subgroup (13 Ss), and a low-risk subgroup (15 Ss). All Ss were born in Groningen University Hospital (The Netherlands). To increase the reliability of neurological test data, standardized examination procedures were used, the state of each S was controlled for each test, the ambient temperature was kept constant, Ss were undressed prior to examination, and examinations were carried out 2 to 3 hours after a feeding. The intensity of many of the neurological signs investigated appeared to be dependent on the age of the S. There was a high correlation between neurological signs exhibited on the first and second days; however, only a few of the neurological findings on the first day were predictive of signs found after the second day. Findings from the fourth day on were representative of those found during the remainder of the neonatal period. The instability of the signs on the first 2 or 3 days of life are probably manifestations of the infant's adaptation to extra-uterine life. This book should be of interest to neurologists, neurophysiologists, behavioral scientists, biochemists, physiologists, obstetricians, and pediatricians. (41 refs.) - *J.K. Wyatt.*

CONTENTS: The Sample; Postnatal Care and General Condition of the Infant; The Neurological Examination; State of the Infant; The Neurological Items; Interrelationships of Neurological Signs in Individual Babies; and Syndromes.

71 MacKEITH, RONALD, & BAX, MARTIN, eds. *Studies in Infancy.* London, England, Spastics International Medical Publications, 1968, 111 p. $4.00.

Significant information about the neurology of infancy gathered by the 5th International Study Group at Oxford (England) in September 1966 stimulated the compilation of a series of review articles about the characteristics of the newborn. Extensive data has been collected about the normal functions of infancy by means of polygraphic recordings and simpler techniques such as skin reflexes. Abnormal neurologic function in infancy is common although frequently transient, and its differential diagnosis is more extensive than it would be in adult life. The relationship between perinatal factors such as complications of pregnancy, prematurity, postmaturity, and birth injuries and subsequent developmental abnormalities has been established but more specific and quantitative work is now required. This volume should be of interest to physicians and public health personnel concerned with infant neurology and the consequences of perinatal morbidity as it reviews the significant accomplishments and suggests a multiplicity of research projects. (217 refs.) - *E.L. Rowan.*

CONTENTS: Polygraphic Studies of the Full-Term Newborn. I. Technical Aspects and Qualitative Analysis; Polygraphic Studies of the Full-Term Newborn II. Computer Analysis of Recorded Data; Some Exteroceptive Skin Reflexes in the Limbs and Trunk in Newborns; The Distribution of Neurological Signs in Early Infancy; A Population Study; Prevention of Rh Haemolytic Disease; Endocrinological Aspects of Convulsions in the Neonatal Period; Characteristics of Fits in the Newborn Period; Do Placenta Previa, Abruptio Placentae and Prolapsed Cord Cause Neurologic Damage to the Infant Who Survives? The Influence of Low Apgar Rating on Infant Mortality and Development; Postmaturity as an Etiological Factor in 124 Cases of Neurologically Handicapped Children; The Predictive Value of the Neurologic Examination in Infancy for Mental Status at Four Years of Age; and The Continuum of Reproductive Causalty.

72 ROBERTS, C.J. The distribution of neurological signs in early infancy: A population study. In: MacKeith, Ronald, & Bax, Martin, eds. *Studies in Infancy.* London, England, Spastics International Medical Publications, 1968, p. 55-64.

A standardized neurological examination was performed on 336 infants (89.1% of the population) born in a defined geographical area (Glamorgan county) in order

to determine the distribution of abnormality in an unselected "normal" population. Between the third and eighth weeks of life, these infants were examined for general appearance and activity, quality of muscle function, posture, reflexes and reactions, spontaneous movements, and abnormal movements and behavior patterns. Abnormal signs were found in 29% (10% hypotonia, 4% 1 or 2 abnormal signs, and 15% marked disturbance of tone plus other abnormal signs). The incidence of abnormality was highest in upper socioeconomic groups (but nonsignificantly so) and not related to parity, maternal age, or age at examination. Hypotonia and hypomotility were the most frequent signs and the combination of these was associated with an increased number of abnormalities in follow-up examination 1 year later. (5 refs.) - *E.L. Rowan.*

73 RICHARDS, F.M., RICHARDS, I.D.G., & ROBERTS, C.J. The influence of low Apgar rating on infant mortality and development. In: MacKeith, Ronald, & Bax, Martin, eds. *Studies in Infancy*. London, England, Spastics International Medical Publications, 1968, p. 84-88.

The relationship between a low Apgar score at 1 minute after birth and the developmental level at 1 year of age was studied among all infants born in a Cardiff (Wales) hospital during the first quarter of 1964. Of 49 infants with Apgar scores, 0 to 4, 8 died during the neonatal period. Twenty-six cases were available for follow-up and these and their controls were examined for gross and fine motor function, adaptive behavior, hearing,vocalization and comprehension, and social and emotional development. There were no significant differences between the 2 groups. Although low Apgar score was associated with high neonatal mortality (7 of the 8 infants who died were of low gestational age), survivors had attained normal development at 1 year of age. If more subtle behavior disorders and learning defects are to be recognized, then additional follow-up will be necessary. (8 refs.) - *E.L. Rowan.*

74 YANG, DOROTHY C., TING, ROSALIND Y., & KENNEDY, CHARLES. The predictive value of the neurologic examination in infancy for mental status at four years of age. In: MacKeith, Ronald, & Bax, Martin, eds. *Studies in Infancy*. London, England, Spastics International Medical Publications, 1968, p. 94-99.

A reliable estimate of mental function at age 4 could be made for 24 MR children, and the records of these and their matched controls were searched for abnormalities on the neonatal and 1-year neurological examinations which might have been predictive of the later MR. No significant differences were found either in the number of abnormal responses or in an overall impression of abnormality. The character of the newborn exam depends on motor and reflex behavior of brain-stem origin and cannot detect subtle cortical dysfunction manifest in the more mature state. The early signs of MR may not lie in motor function but in the observation of adaptive and personal-social behavior. (26 refs.) - *E.L. Rowan.*

75 ZANNOS-MARIOLEA, L., THOMAIDIS, TH., GEORGIZAS, G., GAVRIELIDOU, E., & BENETOS, S. Diagnostic problems in severe neonatal jaundice and G6PD deficiency in Greece. *Archives of Disease in Childhood*, 43(227):36-41, 1968.

Of 302 newborn infants (185 males; 117 females; CA less than 15 days) who were referred to a pediatric clinic because of severe anemia, 33% (99Ss) were found to be glucose-6-phosphate dehydrogenase (G6PD) deficient. Most of the G6PD deficient newborns were found by using the methemoglobin-elution test. Thirty-four of the G6PD deficient newborns were known to have been exposed to toxic chemicals, 9 were ABO incompatibility cases, 1 was Rh iso-immunization case, and in 55 the etiology was unknown (although the mothers of these latter babies were usually given pethidine, hyoscine butylbromide, and vasopressin during labor, and many had also been given tetracycline). G6PD deficiency in newborn infants presents great difficulty in diagnosis and the necessity of using the methemoglobin-elution test is emphasized. (14 refs.) - *K. Drossman.*

Choremion Research Laboratory
Department of Pediatrics
University of Athens
Athens, Greece

76 WILLIAMS, R.D. BROOKE, & HAWKINS, RUTH. The clinical value of cerebrospinal fluid lactic dehydrogenase determinations in children with bacterial meningitis and other neurological disorders. *Developmental Medicine and Child Neurology*, 10(6):711-714, 1968.

Definite increases in lactic dehydrogenase (LDH) activity were observed in the cerebrospinal fluid (CSF) of children with acute bacterial meningitis but not in acute viral infections. LDH activity in the CSF was determined in 43 children with various neurological disorders (acute bacterial meninigitis, acute viral infections, communicating hydrocephalus, febrile convulsions, diffuse organic brain damage with or without convulsions, leukemic involvement of the central nervous system, and/or cerebral anoxia and in 15 controls aged 1 week to 12 years. Increased LDH activity was also observed in some patients with convulsions, diffuse organic brain damage, and hydrocephalus, while LDH values in clinically recovered patients were normal. (11 refs.) - *M.G. Conant.*

Department of Pediatrics
University of Louisville
School of Medicine
Louisville, Kentucky 40202

77 BROCKLEHURST, GORDON. Use of radio-iodinated serum albumin in the study of cerebrospinal fluid flow. *Journal of Neurology, Neurosurgery and Psychiatry*, 31(2):162-168, 1968.

In patients with hydrocephalus, there is a delay in the movement of cerebrospinal fluid labelled with radio-iodinated serum albumin from the lateral

ventricles into which it has been injected. Movement may be measured with a scintillation counter and serial scanning and labelled protein in normal adults is found in the basal cisterns in 1 hour, in the Sylvian fissure in 3, on the brain surface in 12, and throughout the body in 24 hours. Among 29 patients (primarily children with congenital malformations of the central nervous system) there were 2 prominant abnormal patterns of distribution. In "Abnormal A", the isotope remained in the lateral ventricles for 24 hours with slight escape into the rest of the body. This pattern correlated closely with clinical hydrocephalus. In "Abnormal B" there was also no ventricular flow but isotope escaped through abnormal communications between the ventricular system and subarachnoid space over the cerebral hemispheres, thus obviating the need for surgical intervention. This harmless technique is a useful supplement to clinical diagnosis and conventional radiology in difficult cases and in patients where early detection of hydrocephalus might aid surgical management. (5 refs.) - *E.L. Rowan.*

The London Hospital
London E. 1, England

78 DENHOFF, ERIC, & SHAMMAS, ELIAS. Diazepam as an aid in the photo-Metrozol activation test. *Diseases of the Nervous System*, 29(11): 759-762, 1968.

Of the 49 children with learning and behavior disorders who received Metrazol and photic stimulation in an attempt to establish a myoclonic threshold on EEG, 40 then received diazepam to prevent generalized grand-mal convulsions as a result of prolonged abnormal activity. All these persistently abnormal tracings returned to baseline after injection of diazepam, although 9 children required a second administration. One boy who did not receive diazepam after prolonged activation had a generalized convulsion 20 minutes later. With the addition of diazepam to control progression, the photo-Metrazol activation test is useful in determining an organic basis (low seizure threshold and impaired sub-cortical function) for behavior disorders and identifying those children who might reasonably respond to medication. (10 refs.) - *E.L. Rowan.*

Miriam Hospital
Providence, Rhode Island

MEDICAL ASPECTS—PREVENTION AND ETIOLOGY (GENERAL)

79 AKESSON, H.O. Risk figures in mental deficiency. In: Richards, B.W., ed. *Proceedings of the First Congress of the International Association for the Scientific Study of Mental Deficiency*, held September 12-20, 1967, Montpellier, France. Surrey, England, Michael Jackson Publishing, 1968, p. 19-25.

The risk of mental deficiency in parents and sibs of persons with mental deficiency in 2 regions of Sweden was calculated. In Southern Sweden, the prevalence of severe MR was 0.58% and mild MR was 1.17%; in Western Sweden, the prevalence of severe MR was 0.61%. Of these cases, over 90% were of undetermined origin. Figures on these 2 populations indicate that sibs of persons with unclassifiable mental deficiency have a 1.5% to 4.8% chance of being severely MR, and a 5.2% to 16.1% chance of being mildly MR; the parents have a 12.8% to 29.3% probability of being mildly MR. Many of the immediate relatives of mildly MR were also mildly MR, suggesting that mild mental deficiency is transmitted by additive polygenes. Severe mental deficiency is probably due to external agents, abnormalities in the chromosomes, and/or single genes. (6 refs.) - *M.G. Conant.*

80 CYTRYN, LEON. Genetic counselling in mental retardation. *JFRC News*, 2(1):1, 4, 1968.

Genetic counseling has become a more urgent necessity in the light of the discovery of a large number of inherited metabolic disorders associated with MR. Biochemical and cytogenetic tests by specialists should be made before counseling is done and the mathematical statistical risks presented to parents. Whether the mildly MR should have children is an individual family problem and has little effect on the prevalence of MR in the general population. (No refs.) - *E.F. MacGregor.*

Jewish Foundation for Retarded Children
6200 Second Street, N.W.
Washington, D.C. 20011

81 RENWICK, D.H.G. The combined use of a central registry and vital records for incidence studies of congenital defects. *British Journal of Preventive and Social Medicine*, 22(2):61-67, 1968.

The Registry for Handicapped Children and Adults in the province of British Columbia (Canada) was established in 1952 to provide reliable information about the incidence of congenital defects, and supplementation of the Registry by death and stillbirth records has made more comprehensive study possible. Through access to live birth records and information supplied by many reporting agencies, the Registry has information on approximately 3% of the child population of the province. The Registry itself is a good source of information for gross malformations with a relatively low stillbirth rate such as cleft-lip and cleft-palate. For defects such as congenital heart disease which may be occult at birth yet cause early mortality, Registry data must be supplemented by death records. Stillbirth records are necessary in determining the true incidence of central nervous system malformations such as spina bifida and hydrocephalus. Important incidence variables and epidemiological patterns may be discovered as more complete reporting is achieved. (18 refs.) - *E.L. Rowan.*

Health Services and Hospital Insurance
Division of Vital Statistics
Vancouver, British Columbia, Canada

82 KALLEN, BENGT, & WINBERG, JAN. A Swedish register of congenital malformations: Experience with continuous registration during 2 years with special reference to multiple malformations. *Pediatrics*, 41(4):765-776, 1968.

A registration procedure by which malformations observed during the neonatal period are reported monthly, for the purpose of serving as an early warning of teratogens, is described. The written diagnoses together with postmortem findings, x-ray investigations, and other data are reviewed monthly so as to maintain control over the frequency of different malformations. From April 1964 to June 1966, the frequency of malformations was 10.6 per thousand, excluding mongolism and other chromosomal aberrations. The method of collecting and analyzing data on cases of multiple deformities, which are too numerous to have been caused by 2 or more unrelated teratogens, will aid in the identification of unrecognized but typical associated malformations. (12 refs.) - *M.G. Conant.*

Department of Embryology
Biskopsgatan 7,
Lund, Sweden

83 MASTER-NOTANI, PERIN, KOLAH, PILOO J., J., & SANGHVI, L.D. Congenital malformations in the new born in Bombay: Part I. *Acta Genetica Et Statistica Medica*, 181(2):97-108, 1968.

Incidence of congenital malformations in 29,925 pregnancy terminations in Bombay, India from 1960 through 1963 indicates a higher rate of deformities than previously reported. The distribution of malformations in various religious and social communities including Hindus, Muslims, Christians and others was compared. When possible neonates were examined directly with some under recording of data in the emergency group which of necessity came from hospital records. Results show that the malformation rate was significantly higher in emergency patients (2.9%) compared to patients receiving prenatal care (1.4%). No statistically significant difference was observed in the distribution of malformations among the various communities despite a large variation in genetic composition. Malformations do show a much higher incidence with first parity and with increasing maternal age. (16 refs.) - *W. Asher.*

Indian Cancer Research Centre
Parel, Bombay 12
India

84 MASTER-NOTANI, PERIN, KOLAH, PILOO J., & SANGHVI, L.D. Congenital malformations in the new born in Bombay: Part II. *Acta Genetica Et Statistica Medica*, 18(3):193-205, 1968.

Recurrence rates and risk figures for congenital malformations in 24,248 pregnancy termination cases in India were evaluated and divided into Hindu, Muslim and Christian groups for comparison. The single inherited dominant and recessive conditions of achondroplasia, albinism, icthyosis cogenita and microcephaly show no statistically significant increase in any of the groups. Analyses of 8 malformations in a small number of twin pairs (278) gave a malformation rate of 1.44% which is similar to the observed rate (1.40%) in single births. (16 refs.) - *W. Asher.*

Indian Cancer Research Centre
Parel, Bombay 12, India

85 JERVIS, G.A. Remarks on etiological factors of mental retardation. In: Richards, B.W., ed. *Proceedings of the First Congress of the International Association for the Scientific Study of Mental Deficiency*, held September 12-20, 1967, Montpellier, France. Surrey, England, Michael Jackson Publishing, 1968, p. 33-37.

Severe MR is caused by either alterations of genetic material (chromosomal aberrations, recessive genes, dominant genes) (about 25% of cases) or by alterations of environment (infectious factors, toxic factors, physical factors) (about 25% of cases), with the etiology in the remaining 50% of cases still to be discovered. There are 2 contrasting views as to the etiology in cases of mild MR: the genetic view and the environmental view. The former is supported by correlation data and the latter by epidemiologic studies. Etiologic factors, which must be discovered before preventative measures can be instituted, are uncovered in mental deficiencies by several methods: direct determination, identification of clinical syndromes and entities, biochemical screening, chromosomal screening, and genetic surveys. (No refs.) - *M.G. Conant.*

86 PAINE, RICHMOND S. Prenatal and perinatal factors affecting the central nervous system. *Clinical Proceedings Children's Hospital of the District of Columbia*, 24(8):277-293, 1968.

A survey of children with cerebral palsy, MR, and epilepsy shows various etiological factors in these disabilities. In cases of cerebral palsy, an abnormal number of premature births are recorded and it is theorized that since the head is soft, it cannot dilate the cervix effectively, causing the brain to sustain pressure damage. Forceps damage is more difficult to pinpoint as the obstetrician is reluctant to record the use of mid or high forceps and Caesarean sections show a low correlation with cerebral palsy. In MR, about 10% of the cases are caused by pre-, peri-, and postnatal insults similar to those causing cerebral palsy. Other etiological factors are chromosome anomalies, metabolic errors, and low parental IQ. The etiology of epilepsy is the most difficult to determine. At present, it seems that a familial constitution combined with brain injury is a predisposing factor. In minimal brain dysfunction, perinatal insult seems to be the most likely factor. (4 refs.) - *S.L. Hamersley.*

George Washington University
School of Medicine
Washington, D. C. 20001

87 WAGNER, MARSDEN G., & ARNDT, ROLF. Postmaturity as an etiological factor in 124 cases of neurologically handicapped children. In: MacKeith, Ronald, & Bax, Martin, eds. *Studies in Infancy*. London, England, Spastics International Medical Publications, 1968, p. 89-93.

A retrospective study of birth history was carried out with 124 neurologically handicapped children (cerebral palsy, MR and non-specific brain disorders) in order to ascertain if prolonged gestation (postmaturity) associated with placental insufficiency and fetal anoxia might be an etiologic factor in infantile neurological disorders. Of these 124 patients, 28.1% had gestation periods beyond 41 weeks and 13.7% beyond 42 weeks. Comparative figures for natural incidence in a British study were 10.4% and 3.5% and in an American study 21.8% and 8.9%. The average birth-weight for the entire postmature group (42 weeks) was 7.0 pounds compared to a normal birth-weight of 7.8 pounds at that gestational age. If this increased risk of neurological disease with postmaturity is borne out in a prospective study of children born after prolonged gestation, then induction of all infants at term would be indicated. (20 refs.) - *E.L. Rowan.*

88 NELSON, KARIN B. The continuum of reproductive casualty. In: MacKeith, Ronald, & Bax, Martin, eds. *Studies in Infancy*. London, England, Spastics International Medical Publications, 1968, p. 100-109.

The hypothesis of a "continuum of reproductive casualty" predicts an increased incidence of gross and subtle neural damage in survivors of complications during pregnancy and birth which are known to be associated with increased perinatal mortality. Such factors as toxemia, anoxic processes (abruptio placentae, placenta previa, and prolapsed cord), prolonged labor, prematurity, and birth trauma are known to be associated with a higher incidence of cerebral palsy and are probably associated with MR, epilepsy, and behavior disorders. However, most studies suffer from unreliable data gathering processes, poor control groups, and a real inability to control for intervening economic, social, and psychological factors. The hypothesis has served its purpose of focusing attention on consequences of the complications of pregnancy and the birth process, but for the future, meaningful questions must be framed in more specific and quantitative terms. (67 refs.) - *E. L. Rowan.*

89 STICKLE, GABRIEL. Defective development and reproductive wastage in the United States. *American Journal of Obstetrics and Gynecology*, 100(3):442-447, 1968.

Reproductive wastage refers to that proportion of human conceptions which do not develop into viable infants who survive 1 year beyond delivery. Of an estimated 5.7 million conceptions annually in the United States, 1.7 million are aborted spontaneously, miscarried, or born dead, and 100,000 live births fail to survive infancy. About 38% of fetal deaths take place during the first 3 weeks of pregnancy, and an additional 43% during weeks 4 to 11. Defects of the fetus or accessory structures and Rh disease account for the majority of these fetal deaths. Postnatal losses result from 3 interdependent factors: prematurity, congenital defects, and asphyxia and atelectasis. This public health challenge of fetal loss might be met with genetic counseling, more adequate prenatal care, and ultimately with "eugenic engineering" at the molecular level in order to improve the quantity and quality of human reproduction. (14 refs.) - *E.L. Rowan.*

No Address

90 REISS, M. New perspectives concerning the interrelation between endocrine function, heredity and environment during the development of mental retardation. In: Richards, B.W., ed. *Proceedings of the First Congress of the International Association for the Scientific Study of Mental Deficiency*, held September 12-20, 1967, Montpellier, France. Surrey, England, Michael Jackson Publishing, 1968, p. 216-223.

The role of endocrinology is discussed with respect to the study of chromosomes, molecular biology, inborn errors of metabolism, and environment. There is presently a preoccupation with genetic approaches to the exclusion of other preventative measures. For instance, the endocrinology of the mother of a mongoloid has not been studied. Research in molecular biology and inborn errors of metabolism is overly concerned with genetics; it should be recognized that the intrauterine environment is at least as important as hereditary endowment in the etiology of MR. The efficacy of dietary restriction in the treatment of PKU is questioned. It is probable that there is a pathway by which the genetic program is regulated by prior interaction of the genes and endocrine functions. (27 refs.) - *M.G. Conant.*

91 FREYTAG, ELLA, & LINDENBERG, RICHARD. Neuropathologic findings in patients of a hospital for the mentally deficient. A survey of 359 cases. *Johns Hopkins Medical Journal*, 121(6):379-392, 1967.

Of 359 cases examined neuropathologically at a state institution for MR, 83% showed organic cerebral lesions as the cause of their clinical deficits. The most frequent group of lesions were developmental disorders including hydrocephalus and more subtle changes in the cerebral convolutions, brain stem, and cyto-architecture. Brain damage from circulatory disorders was next in frequency. These lesions resulted primarily from "anoxia" and rarely from infarctions. Other significant disorders included post-infection syndromes, storage diseases, tumors, and Down's syndrome. Half the lesions were present before birth, 16% were related to the birth process (but rarely to mechanical force per se), and 24% occurred later. Ten percent were undetermined. Among the 17% of patients without brain lesions, a small fraction had clinical evidence of cretinism or phenylketonuria. The others may have had lesions too small to be detected with contemporary technique or metabolic disorders as yet undiscovered. (13 refs.) - *E.L. Rowan.*

Maryland State Department of Mental Hygiene
Annapolis, Maryland

92 BRIMBLECOMBE, F.S.W., ASHFORD, J.R., & FRYER, J.G. Significance of low birth weight in perinatal mortality: A study of variations within England and Wales. *British Journal of Preventive and Social Medicine*, 22(1):27-35, 1968.

Demographic data on birth-weight and perinatal mortality were analyzed for each local authority area in England and Wales (1963-1965) in an attempt to understand why 65% of all perinatal deaths occurred in infants of low birth-weight (less than 2,501 gms). For all birth-weight groups below 2,501 gms, the rate was higher in urban areas than rural and higher in the Northern, Midland, and South Wales regions. Perinatal mortality rates followed the same pattern as birth rate and survival was closely related to higher birth-weight. A lesser gestational age at birth is usually associated with low birth-weight and risk of death, but this information is not retrievable from the data. Similarly, other factors such as the presence of congenital malformations, economic and social conditions, and standards of medical care require further investigation. (21 refs.) - *E.L. Rowan.*

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Exeter, Great Britain

MEDICAL ASPECTS—ETIOLOGIC GROUPINGS
Infections, intoxication, and hemolytic disorders

93 STERN, H. Isolation of cytomegalovirus and clinical manifestations of infection at different ages. *British Medical Journal*, 1(5593):665-669, 1968.

An epidemiological survey of 118 neonates in London hospitals to determine cytomegalovirus infection discovered 3 infants secreting virus. All 118 infants were healthy at birth; however, although the 3 virus excreters did not have clinical symptoms of cytomegaloinclusion disease, 2 are now MR, and the other has had abnormal liver function. Another survey of 136 older children found 14 to be virus excreters and 2 of these had hydrocephalus. In a related study, 50 neonates and 24 children (CA 3 mos to 10 years) with idiopathic liver disorders were examined and cytomegalovirus was isolated from 2, rubella from 2, and *Herpes simplex* from 1. Overall then, 10% of children between 2 mos and 5 yrs were found to be cytomegalovirus excreters, but only 1 excreter was found among 575 older children and adults. The infection is chronic in young children with prolonged virus excretion and may cause liver damage from which the children usually recover. (42 refs.) - *K. Drossman.*

St. George's Hospital
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England

94 HANSHAW, JAMES B. Congenital cytomegalovirus infection. *Birth Defects Original Articles Series*, 4(7):39-45, 1968.

The incidence and prevalence of congenital cytomegalovirus infection in infants are described and seroepidemiologic analyses of children with microcephaly were completed. Antibody was present in

the sera of 44% of children with head circumference below the third percentile, while only 4% of a control group were seropositive. There were no exclusions for extra-neural manifestations suggestive of cytomegalic inclusion disease (CID), toxoplasmosis or rubella. A total of 58 infants were tested for cytomegalovirus complement-fixing (CMVCF) antibody and 34.5% (20 infants) were seropositive. Analysis of 52 normocephalic children with similar CA showed 5.8% to be seropositive. There were no significant differences in groups when tested for toxoplasmosis, rubella, or*Herpes simplex*. The diagnosis of CID often cannot be done by clinical observation since it is similar in clinical signs to toxoplasmosis, rubella, and *H.simplex*. Histopathological analyses, virus isolation, and serologic tests should be employed as well as complement-fixation tests, neutralization tests, and fluorescent antibody tests. The hazard of cytomegalovirus infection is primarily in damage to the fetus; therefore, expectant mothers should avoid personal contact with those who have this infection. (21 refs.) - *B. Bradley.*

University of Rochester
School of Medicine
Rochester, New York

95 CONCHIE, A.F., BARTON, B.W., & TOBIN, J. O'H. Congenital cytomegalovirus infection treated with idoxuridine. *British Medical Journal*, 4(5624):162-163, 1968.

A 7-week-old infant with small head circumference, irritability, poor eating habits, and increased muscle tone was diagnosed as having congenital cytomegalovirus infection. Idoxuridine (600 mg/kg intravenously over 5 days) was given and produced a prompt drop in virus excretion. Although the child's head remained small and the muscles remained somewhat spastic, she showed marked improvement in her eating and general well-being. The drug in the dosage used had no adverse effect on the liver function nor on the white blood cell or platelet counts. (4 refs.) - *D.Plaut.*

Victoria Hospital
Worksop, England

96 SCHAFFNER, WILLIAM, SCHLUEDERBERG, ANN E.S., & BYRNE, EARL B. Clinical epidemiology of sporadic measles in a highly immunized population. *New England Journal of Medicine*, 279(15):783-789, 1968.

An epidemiological study of 106 suspected cases of measles in Rhode Island following a statewide immunization program revealed 49 to be actual cases which occurred sporadically or in familial clusters and the remainder were illnesses of viral origin which simulated the disease. In the first phase of the study, 42 of 71 suspected measles cases were considered to be clinically compatible with the disease. Serological studies in 32 confirmed 10 as recent infections and 17 as past infections; 10 others were not studied serologically. Of the 42, 14 were solitary cases in that they did not give rise to other cases. The remaining 28 occurred in 5 clusters. In the second phase of the study, 29 of 35 suspected cases of measles were found. Of these, 9 occurred as sporadic cases, and the remainder occurred in 3 familial clusters. Of the total of 49 cases ultimately confirmed as measles, military dependents, personnel, or employees accounted for 1/2. Since other agents appear to mimic measles, it may soon become difficult for the clinician to accurately diagnose it in areas where widespread eradication programs have been instituted. From the current epidemiological study, it would appear the immunization has markedly reduced the incidence of measles in Rhode Island. (24 refs.) - *E. Gaer.*

Epidemiology Program
National Communicable Disease Center
Atlanta, Georgia 30333

97 DANO, GEORG. Acute cerebellar ataxia associated with Herpes simplex virus infection. *Acta Paediatrica Scandinavica*, 57(2):151-152, 1968.

The case of an 8-year-old boy who developed acute cerebellar ataxia following *H.simplex* infection is presented; this association has not previously been documented. Evidence for acute cerebellar ataxia included acute vertigo, dysarthria, severe ataxia, and jerky eye movements; the EEG was abnormal but cleared rapidly as did the clinical signs. There was both clinical and serological evidence for *H.simplex* infection; acute and convalescent sera were studied in separate laboratories and a rise and fall in complement-fixing antibodies was demonstrated. Attempts to isolate Coxsackie, polio, ECHO, Adeno, and *H.simplex* viruses from feces were unsuccessful, and negative titers to parotitis, adenoviruses, RSSE, polio-viruses, and influenza A and B were obtained. (12 refs.) - *D. Martin.*

Department of Pediatrics
Lasarettet
Umea, Sweden

98 NORMAN, M.G., *LOWDEN, J.A., HILL, D.E., & BANNATYNE, R.M. Encephalopathy and fatty degeneration of the viscera in childhood: II. Report of a case with isolation of influenza B virus. *Canadian Medical Association Journal*, 99(1):549-554, 1968.

The syndrome first described by Reye, Morgan, and Baral of encephalopathy, fatty liver, and initial hypoglycemia is further illustrated by a case report on a 9-year-old girl with all previously described clinical symptoms who, at autopsy, also had influenza B virus isolated from liver samples. The biochemical aspects of glucose and glycogen metabolism in this disorder are discussed; apparently as a result of the acute viremia, the liver cells are initially depleted of glucose, glycogen, and citric acid cycle intermediates thereby causing the cells to become unable to utilize exogenous glucose. The hypoblycemia also leads to a decrease in cerebral galactolipids which is probably the reason for the irreversible course of the encephalopathy. (23 refs.) - *K.Drossman.*

*The Research Institute
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555 University Avenue
Toronto 2, Ontario, Canada

99 POSER, CHARLES M., & KUIKEN, BEN C. Acute hydrocephalus following H. influenzae meningitis. *Diseases of the Nervous System*, 29(12):823-826, 1968.

A 13-month-old male infant presented with *Haemophilus influenzae* type B meningitis which was treated with ampicillin and chloramphenicol. The child was comatose and decerebrate on the day following admission and acute hydrocephalus became apparent on the twenty-second day. Pathogenic mechanisms believed to have contributed to this condition include cerebral thrombophlebitis leading to dural sinus obstruction and impairment of CSF reabsorption and venous return, cerebral swelling and possible excessive CSF exudation, and blocked CSF circulation due to severe cerebral swelling and perhaps the presence of purulent material. (4 refs.) - *M.G. Conant.*

Department of Neurology
Mary Fletcher Hospital
Burlington, Vermont 05401

100 PINEDA, REBECCA G., DESMOND, MURDINA M., HALLEEN, WAYNE, RAWLS, WILLIAM, & ZIAI, MIR-HASHEM. Impact of the 1964 rubella epidemic on a clinic population. *American Journal of Obstetrics and Gynecology*, 100(8):1140-1146, 1968.

The incidence of congenital rubella in a low socioeconomic group in Houston (Texas) during the 1964-1965 epidemic is presented. Thirty-one infants with clinical rubella or with a maternal history of rubella were found. Twelve of the infants died at less than 3 months of age, and only 2 survivors showed no defect or handicap at age 18 months. Clinical symptoms were more helpful than a maternal history of rubella in recognizing infections early in the epidemic. Rubella infants had a high incidence of intrauterine growth retardation and 39% scored less than 6 on the Apgar scale. Public health education in the indigent population concerning congenital rubella is urgently needed. Forty-nine percent of the pregnancies were also complicated by other factors, and only 58% of the mothers had had any prenatal care. (14 refs.) - *L.E. Clark.*

Baylor University
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Houston, Texas

101 ALFORD, BOBBY R. Rubella-la bete noire de la medecine. *Laryngoscope*, 78(10):1623-1659, 1968.

A longitudinal study of 160 children whose mothers had rubella during pregnancy has been made; 19 of the original group died because of congenital abnormalities, and congenital defects were present in 136 of the 141 survivors. The defects included: eye defects (99 Ss); hearing loss (90 Ss); cardiac abnormalities (84 Ss); and orthopedic or neurological defects (65 Ss). Only 5 children were found to be normal; however, 2 of these 5 had either a positive rubella viral culture or had positive serological tests for rubella antibodies. Many of the children with hearing loss demonstrated a progressive type of hearing disorder and 5 case histories describe in detail the histological and pathological changes in the temporal region and ear structures. Until a vaccination program becomes safe and effective, it is advisable to see that all young girls are exposed to rubella before they reach child-bearing age. (84 refs.) - *K. Drossman.*

Department of Otolaryngology
Baylor University College of Medicine
Houston, Texas

102 VERNON, McCAY. Characteristics associated with post-rubella deaf children: Psychological, educational, and physical. *Volta Review*, 64(3):176-185, 1967.

It is estimated that the 1963-1965 rubella epidemic has produced thousands of youngsters with hearing losses, frequently complicated by multiple handicaps and learning and behavior problems, thus necessitating new techniques for facilitating learning and modifying behavior. A study of the impact of the neurophysiological residual of rubella included 129 post-rubella deaf students in a residential school. Forty-three were born prematurely, and 53.8% had multiple handicaps, aphasia, and emotional disturbance. The average intelligence of the Ss was significantly below that of normal children, with 8% MR. Academic achievement and communication skills, as measured by written language, were significantly below that of other deaf groups. Psychologists rated 27% of the Ss emotionally disturbed and teacher ratings of adjustment showed the post-rubella deaf to be the most maladjusted of the 5 etiological deaf groups studied. Forty-seven percent of the Ss obtained pathological results on the Bender-Gestalt test. (14 refs.) - *A.W. Jordan.*

Institute for Psychomatic and
Psychiatric Research and Training
Michael Reese Hospital
Chicago, Illinois

103 COOPER, LOUIS Z. Rubella: preventable cause of birth defects. *Birth Defects Original Article Series*, 4(7):23-35, 1968.

An overview of rubella is presented with emphasis upon vaccines to be used in prevention. Statistical data indicated that in 1964 1% of pregnancies in New York City were rubella casualties. This review of data deals primarily with the rubella research program at New York University Medical Center. Rubella virus is distinct from all other known viruses and is antigenically stable—an advantage in developing a vaccine. The basic problem is rubella's effect on young adults. Serologic study is one method of confirming diagnosis, but there is a difficulty in confirming this diagnosis if the patient is seen more than a few days after the rash has started. Maternal-fetal rubella is most damaging during the second to sixth week after conception. The fetus is not as susceptible to infection after the fifth month of gestation. There are a variety of neonatal abnormalities which result from congenital rubella, and these include: heart disease, hearing loss, eye defects, psychomotor retardation, and thrombocytopenic purpura. There appears to be almost a 1:1 relationship between this fetal infection and anomaly. Children suffering from multi-handicaps as a result of this infection are not receiving adequate programs. γ-Globulin has not been determined to be a preventive of congenital rubella since

often it is not administered until some time after initial exposure. Trial vaccines appear to be effective and safe; however, some women develop a transient arthralgia, or arthritis and paresthesia similar to those found in the disease itself. Rubella vaccines are expected to be publicly available soon and will aid in eliminating a cause of birth defects. (50 refs.) - *B. Bradley.*

104 WHITE, LON R., LEIKIN, SANFORD, VILLAVICENCIO, OLMEDO, ABERNATHY, WILLIAM, AVERY, GORDON, & SEVER, JOHN L. Immune competence in congenital rubella: Lymphocyte transformation, delayed hypersensitivity, and response to vaccination. *Journal of Pediatrics*, 73(2):229-234, 1968.

Virologic and immunologic studies were carried out on 7 infants (1-2 yrs of age) with clinical signs of intrauterine acquired rubella infection and the absence of recoverable rubella virus. Immunization with vaccinia and diphtheria produced systemic, cutaneous, and antibody responses similar to those of normal control infants and the lymphocytes of both groups showed comparable blast transformation in culture with phytohemagglutinin. Significant blast response to vaccinia was observed in all 11 controls and 2 rubella patients and lymphocyte response to diphtheria toxoid in culture was shown by 9 of the 11 controls and 2 of the 7 patients. Skin tests with *Candida albicans* antigen produced positive responses in 7 of the 10 controls and 2 of the 7 patients. These *in vitro* studies suggest that the rubella infection produces a generalized effect on the immune mechanism, since lymphocytes from patients showed impaired reactivity to an antigen unrelated to their rubella infection. (16 refs.) - *M.G. Conant.*

National Institute of Child Health
and Human Development
National Institute of Health
Bethesda, Maryland

105 RAWLS, W.E., MELNICK, J.L., BRADSTREET, C.M.P., BAILEY, M., FERRIS, A.A., LEHMANN, N.I., NAGLER, F.P., FURESZ, J., KONO, R., OHTAWARA, M., HALONEN, P., STEWART, J., RYAN, J.M., STRAUSS, J., ZDRAZILEK, J., LEERHOY, J., VON MAGNUS, H., SOHIER, R., & FERREIRA, W. WHO collaborative study on the sero-epidemiology of rubella. *World Health Organization Bulletin*, 37(1):79-88, 1967.

A study was made in 9 laboratories throughout the world to determine the distribution of rubella antibodies in women of child-bearing age. The pattern of development of antibody was similar; the reliability and reproducibility of the tests showed no significant differences in titre variability in different laboratories as compared with those obtained by repeatedly testing the same sera in 1 laboratory. Approximately 50% of persons tested had antibody at 6-8 years of age and the percentage increased to 80-88% at age 17-22 years. The percentage remained relatively constant thereafter. In Japan the older age groups of Sapporo had significantly fewer sera with antibody than the same age groups of European cities and rural area of Ohtsu had significantly larger susceptible population among females of all age groups. In the United States and Canada, the pattern of antibody acquisition was similar to that in the European countries. In Jamaica and Trinidad the number of persons past the age of 12 years with antibody was significantly lower indicating a large susceptible population. (26 refs.) - *F.J. McNulty.*

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Houston, Texas

106 U.S. license near for rubella vaccine. *Medical World News*, 9(45):25-27, 1968.

Three strains of rubella vaccine are under careful scrutiny prior to licensing in the United States. HPV-77, presently being tested and produced by 3 American pharmaceutical firms, was tested in a natural epidemic in Taiwan (1968) and proved over 90% effective in 3,269 schoolboys (grades 1-4); a placebo was given to 2,841 controls. A report of the study which was made to the National Institute of Health included the observation that adverse effects which occur in adults are not significant. The Cendehill strain (European) was tested in 3 small studies in the United States. One-half of 56 Ss in a children's home in Massachusetts received the vaccine, while the other 1/2 served as contact controls. Twenty-four of the 28 vaccinated Ss (86%) were protected and none of the control Ss developed antibodies. Similar studies in California (40 Ss–20 vaccinated and 20 controls) and in Pennsylvania (4 studies with 200 children) confirmed the effectiveness of Cendehill. Also effective (90% of 59 Ss tested) but requiring 10 times the dosage as HPV-77 or Cendehill, is RA27/3, a vaccine given intranasally, which was produced from a virus in a human fetus aborted by a rubella-exposed mother. It is concluded that licensing of the rubella vaccines in the United States will profoundly affect the epidemiology of the disease. (No refs.) - *V.R. Shaffer.*

107 HERRELL, WALLACE E. Progress in control of viral infections. *Volta Review*, 70(9):707-709, 1968.

Significant advances have been made in the development of vaccines for respiratory infections, mumps, rubella (german measles), and rubeola. Although it is difficult to control viral respiratory infections, some mixed polyvalent virus vaccines have been developed and tested with good results. A vaccine for mumps has been developed with live virus and also has produced good results. Rubeola virus vaccine is nearly 100% effective in preventing the disease. A safe vaccine for rubella will soon be available and perhaps legislation should require it as a prerequisite for marriage. (No refs.) - *M.T. Lender.*

No address

108 *Intrauterine Infections.* In: *Birth Defects Original Article Series*, Volume 4, Number 2, New York, New York, The National Foundation, 1968, 68 p. $5.00.

A symposium directed toward the problem of intrauterine infections and their relationships to birth

defects is presented. A variety of problems are discussed and the areas of experimental studies are evaluated. There is much concern with prevention as evidenced by studies on rubella vaccines and new diagnostic techniques, such as the IgM-flourescent antibody method for toxoplasmosis, were described. All 5 studies indicated that microbial infections of bacterial, protozoal and viral etiology may affect the fetus and is concluded that a relationship exists between maternal intrauterine infection and congenital syphilis, rubella and cytomegalovirus. A similar relationship for other viral agents may exist; however, their role has yet to be determined. Specific emphasis is on diagnostic techniques, etiological factors, transmission agents, incidence and prevalence and the role of infections in intrauterine illness. Overviews and specific studies are both included in these presentations and symposium participants are listed at the end of the book. (178 refs) - *B. Bradley.*

CONTENTS: The Diagnostic Significance of IgM- Globulin Elevations in Newborn Infants with Chronic Intrauterine Infections (Alford, Blankenship, Straumfjord, & Cassady); Rubella: A Preventable Cause of Birth Defects (Cooper); Congenital Cytomegalovirus Infection (Hanshaw); Toxoplasmosis and Congenital Infection (Remington); and The Possible Relationship of Viruses, other than Rubella and Cytomegalovirus, to the Etiology of Birth Defects (Katz).

109 ALFORD, CHARLES A., BLANKENSHIP, WILLARD J., STRAUMFJORD, JON V., & CASSADY, GEORGE. The diagnostic significance of IgM-globulin elevations in newborn infants with chronic intrauterine infections. *Birth Defects Original Article Series*, 4(7):5-19, 1968.

IgM-globulin levels were analyzed in newborn infants to determine the presence of congenitally acquired infections. The infants were selected from an urban and indigent group and included 43 infected and 176 controls. Serial, clinical, immunological and microbiological examinations were given at various times to ascertain the diagnostic significance of IgM-globulin elevations. The results showed that 40 of 43 infected infants displayed increased quantities of serum IgM globulin beyond the first standard deviation limit of the control Ss. Additional analyses revealed that in 38 cases the elevations extended beyond the second standard deviation limit. Elevated amounts of IgM globulin continued in the sera of the affected infants sometimes beyond the neonatal period. Amounts of IgM globulin appeared to be dependent upon several factors. For example, intrauterine rubella and syphilitic infections resulted in higher mean levels of serum IgM globulin than those from cytomegaloviral, toxoplasma or enteroviral infections. Duration of infection was considered as an important variable. Another possible factor was the quantity of the pathogen generated and its tissue distribution. Clinical diagnostic signs of infection were absent in 16 Ss and not distinctive in 24 cases. It was concluded that serum IgM globulin elevations are present in a varied range of clinical illness associated with intrauterine infections in newborn infants. Screening of cord sera for these elevations is considered of diagnostic importance since congenital infections appear more prevalent than previously believed. Specific methods should be added to screening techniques. (41 refs.) - *B. Bradley.*

110 KATZ, SAMUEL L. The possible relationship of viruses, other than rubella and cytomegalovirus, to the etiology of birth defects. *Birth Defects Original Article Series*, 4(7):59-64, 1968.

Viral etiology and its role in birth defects are discussed with particular reference to viruses other than rubella and cytomegalovirus. Some viruses in the mother will not infect the placenta; some will infect the placenta also, while others can cross the placenta to the embryo or fetus. Avoidance of all live virus vaccines during pregnancy except when risk is imminent should be followed since animal data indicates possible fetal damage. Fetal death can occur from acute viral illness from almost any agent producing "toxicity and fever." Coxsackie B and *Herpes simplex* produce overt virulent infections in the fetus in the immediate perinatal period. Perinatal infection can result from maternal viremia or as a result of contact in the birth canal. It is felt that a list of dangerous viruses beyond rubella and cytomegalovirus is still uncertain; however, criteria have to be modified to include *H. simplex* and Coxsackie B viruses. More data are needed to ascertain the effects of mumps and hepatitis. Stages in intrauterine viral infection are: occult or overt maternal infection; dissemination of maternal infection; infection of placenta; seeding of the fetus; and infection of fetal cells. (18 refs.) - *B. Bradley.*

111 STOLLER, A. Virus action during meiosis or early mitosis in mothers as a possible cause of congenital anomalies. In: Richards, B. W.. ed. *Proceedings of the First Congress of the International Association for the Scientific Study of Mental Deficiency*, held September 12-10, 1967, Montpellier, France. Surrey, England, Michael Jackson Publishing, 1968, p. 56-65.

A series of epidemiological studies in Victoria (Australia) found a correlation between the incidence of infectious hepatitis and, 9 months later, the incidence of mongolism and hydrocephaly. These findings have not been duplicated elsewhere but may be corroborated when it becomes possible to grow the hepatitis virus in the laboratory. Correlations also have been reported among incidences of Down's syndrome, leukemia, congenital heart disease, A-V canal defect, and cancer. It has been reported that the incidence of all trisomies increases with age, and the biological aspects of aging in females have been extensively investigated. An hypothesis of increased aneuploidy with age and a possible linkage with mongolism due to *Mycoplasma* has been proposed. The analogies between oncogenesis and teratogenesis are discussed and their link with Down's syndrome, congenital heart disease, leukemia, and cancer are noted. (71 refs.) - *M.G. Conant.*

112 LOKEN, A.C., & LUNDERVOLD, A. Types of probable virus encephalitis in Norwegian autopsy material. *Journal of the Neurological Sciences*, 6(3):447-462, 1968.

Review of autopsy data from Rikshospitalet, Oslo (Norway) from 1952-1966 revealed 35 cases of probable virus encephalitis which were separated into 4 groups on the basis of clinical symptoms and histopathological picture. The first group (13 cases) corresponded to

acute necrotizing encephalitis, probably caused by *Herpes simplex* virus. Inclusion bodies of the Cowdry type A were present in all cases as well as in 6 of the 15 cases of subacute sclerosing encephalitis (second group). The duration of the illness varied from 1 month to 8 years in this group. The third group (5 cases) included encephalitis of uncertain type where histopathological data were sparse and untypical. The fourth group (3 cases) included infants under 2 years of age with cytomegalic inclusion encephalitis. EEG patterns in the first 3 groups varied greatly from patient to patient, with marked abnormality in all. (44 refs.) - *M.G. Conant.*

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113 REMINGTON, JACK S. Toxoplasmosis and congenital infection. *Birth Defects Original Articles Series*, 4(7):49-56, 1968.

The epidemiology of toxoplasmosis is discussed and new diagnostic techniques are described. Serologic diagnosis is complicated due to the presence of passively transferred maternal antibodies. A high antibody titer may show only a recent infection in the mother. This discussion excluded acquired toxoplasmosis, relationship to abortion, and congenital transmission during chronic infection in the mother. Incidence of toxoplasma antibodies in normal children from a variety of geographical areas shows a high percentage (84%) in Athens, Greece, decreasing to 0% in the Navajo Indians population in Arizona. In studies of these organisms data showed a strong survival potential in spite of low pH and high enzyme content. Data regarding transmission indicate some support for the meat to man transmission. Observations from a Children's Tuberculosis Hospital in France showed an increase from no toxoplasma antibodies in 641 children on admission to an incidence of 204 children (31%). This was cited as 5 times as high as found in the general population. As the ration of undercooked meat was increased, the number of infections increased significantly; however, both plant-eating animals and people also acquire this disease. Recent research indicates that man may be infected from domestic animals. The incidence of congenital toxoplasmosis is undetermined but there is evidence of crippling effects of congenital infection. Specific clinical signs of congenital toxoplasmosis may include: hydrocephalus, chorioretinitis, and cerebral calcification but other non-specific signs should not be overlooked. In some cases these have been wrongly associated with other diseases. Present diagnostic methods are inadequate. A new screening procedure called the IgM-flourescent antibody method appears to be effective, specific and easy to perform. It can be used in a laboratory with a flourescence microscope and requires about 2 hours to perform. (48 refs.) - *B. Bradley.*

114 BERARD-BADIER, M., LAUGIER, M., LOUCHET, E., & PAYAN, H. La placenta dans la toxoplasmose congenitale aigue experimentale du cobaye (The placenta in experimental acute congenital toxoplasmosis of the guinea pig). *Pathologie et Biologie*, 16(19-20):829-835, 1968.

Forty-seven placentas removed from guinea pigs inoculated at various stages of pregnancy with toxoplasma were examined. Some of the animals were inoculated with the RH Sabin strain and some with strain 76. In 19 cases, the placentas were normal (12 young born living and 7 abortions) and in 28 cases, the placentas were pathological (9 abortions, 8 born dead, and 8 born living), with lesions resembling the visceral lesions of toxoplasmosis. In the remaining case, the placenta was parasitic but the young were unaffected. If the placenta was normal, the young were healthy. The RH Sabin strain, the more virulent, caused abortion in 26% of the cases and produced considerable multiplication of parasites *in situ*. The strain 76 caused abortion in 17% of the cases and latent toxoplasmosis in 47%, with limited, localized lesions. Apparently, transmission to the fetus occurs at the moment of inoculation of the toxoplasma or after a latent period necessary for lesions to develop. (33 refs.) - *M. G. Conant.*

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13-Marseille-5, France

115 SANDERS, DORIS Y., & STEVENSON, JOHN. Bacteroides infections in children. *Journal of Pediatrics*, 72(5):673-677, 1968.

The case reports of 4 children with *Bacteroides* infections, demonstrate that this group of pathogens can be etiological to a variety of clinical disorders. A 14-year-old boy was initially treated for an abscess of the eyelid; however, he subsequently developed signs of meningitis with a frontal lobe abscess and died within 4 days. Chloramphenicol and penicillin treatment did not contol the infection. Two siblings with bone joint infection were found to have *Bacteroides* organisms in the affected joint; both brothers had congenital agammaglobulinemia. The *Bacteroides* infections in both boys responded to treatment with penicillin, tetracycline, and/or chloramphenicol. A fourth case (a 5-year-old boy) had a posterior cervical abscess, which was excised. Other cases have demonstrated that the organism can be cultured from blood, abscess material, vaginal discharge, epithelial tissues, cerebrospinal fluid, and brain tissues. The portal of entry is usually the oropharynx. Most species are sensitive to tetracycline and chloramphenicol and some to penicillin. Early diagnosis and treatment can reduce the high mortality rate from infection with these organisms. (25 refs.) - *M.T. Lender.*

Department of Pediatrics
Bowman Gray School of Medicine
Winston-Salem, North Carolina 27103

116 TATETSU, SEIJUN, TOYA, GYO, & MIYAKAWA, TAHEI. An autopsy case of brainstem encephalitis. *Psychiatria et Neurologia Japonica*, 70(1):1-10, 1968.

A male patient (CA 35 years) presented with headaches, cataplexia, spastic tetraplegia, depression, and progressive MR and was diagnosed as having brainstem encephalitis of at least 11 years duration. At autopsy, the brain was noted to weigh 1,350 gms and was slightly opaque with thick meninges. Histopathologically, sharply demarcated diffuse myelin degeneration was

found in the optic nerve, the mediodorsal part of the globus pallidus, the crus cerebri, the pons, and the medulla oblongata. In these areas there was a proliferation of glia cells, a perivascular cellular infiltration, and the blood vessels were surrounded by numerous lipid granular cells. The similarities to Neuro-Behcet disease, some encephalitides, and several demyelinating diseases were noted. (33 refs.) - *M. Drossman.*

Department of Neurospychiatry
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Kumamoto, Japan

117 STOVER, SAMUEL L., WANGLEE, PENSRI, & KENNEDY, CHARLES. Acute hemorrhagic pancreatitis and other visceral changes associated with acute encephalopathy: Report of three cases. *Journal of Pediatrics*, 73(2):235-241, 1968.

Three children with clinical encephalitis also had acute hemorrhagic pancreatitis and cerebral lesions at postmortem. There was little evidence that acute hemorrhagic pancreatitis was a complication of the primary illness, encephalitis, or of therapy; this suggested that the visceral degeneration seen was mediated by a severe response to a viral infection, even though no virus was detected in the one case in which an attempt was made to isolate a viral agent. Furthermore, the possibility that other factors, such as steroid therapy, hypothermia, and mechanical ventilation, contributed to the severe response to viral infection could not be excluded. (51 refs.) - *K. Drossman.*

Department of Physical Medicine
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118 KATZ, MICHAEL, RORKE, LUCY BALIAN, MASLAND, WILLIAM S., KOPROWSKI, HILARY, & TUCKER, SAMUEL H. Transmission of an encephalitogenic agent from brains of patients with subacute sclerosing panencephalitis to ferrets. *New England Journal of Medicine*, 279(15):793-798, 1968.

Ferrets inoculated with cerebral tissues obtained on biopsy from children afflicted with subacute sclerosing panencephalitis (SSPE) developed the disease after a long incubation period as did a second group of ferrets inoculated with cerebral tissue from the first group which would indicate that SSPE is caused by a slow virus. Brain biopsies from the right frontal lobe were taken from 3 children who showed symptoms of the disease including intellectual deterioration, myoclonic seizures, coma, and characteristic spinal fluid, electroencephalogram (EEG) and histological findings. The first group of inoculated ferrets began to show clinical symptoms after 5 months and the second passage group began to show changes 3 months after inoculation with tissues from the first group. Pathological changes in all ferrets consisted of a diffuse nondemyelinizing meningoencephalitis affecting the cerebral cortex, white matter, basal nuclei, brain stem, and spinal cord but sparing the cerebellum. A third passage of the virus to ferrets caused EEG changes and clinical symptoms after 3 weeks. Ferrets inoculated with blood serum from patients with SSPE or with cerebral tissues from patients dying from other causes exhibited neither symptoms nor histological changes of SSPE. None of the affected ferrets showed hemagglutination-inhibition or complement-fixation antibodies against either measles or distemper viruses. The failure in the current study to isolate measles virus does not totally exclude it and indeed more than one viral agent may be responsible. (8 refs.) - *E. Gaer.*

Wistar Institute of Anatomy and Biology
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119 GEBESH, V.V. Blizhaishie i otdalennie posledstviya virusnikh serovnikh meningitov (The immediate and remote sequelae of viral serous meningitis). *Zhurnal Nevropatologii i Psikhiatrii*, 68(3):330-334, 1968.

Follow-up studies on 128 children who had had viral serous meningitis demonstrated that 47.6% had astheno-hypertensive disorders as sequelae. Such residual effects are more likely if the disease followed a serious course with cerebrospinal fluid hypertension and pleocytosis and are dependent upon the age of the patient and the exact virus pathogen. In order to prevent serious sequelae, patients should have early hospitalization, strict bed rest for at least 3 weeks, limitation of mental and physical exertion after discharge (for at least 6 months), and regular check-ups for at least a year. (9 refs.) - *M. Drossman.*

No address

120 MOSUCHUK, N.M. Pronitsayemost' gemato-zntsefalicheskogo bar'era dlya antibiotikov u bol'nikh gnoinim meningitom (The permeability of antibiotics through the hemato-encephalic barrier in patients with suppurative meningitis). *Zhurnal Nevropatologii i Pskhiatrii*, 68(3):338-341, 1968.

The permeability of the hemato-encephalic barrier to antibiotics was investigated in 17 patients with suppurative meningitis. Antibiotic concentration was measured in the cerebral spinal fluid (CSF) by a method of serial dilutions. Antibiotics may be found in the CSF in maximum concentrations within 3 hours after introduction into the blood stream. The higher the dose of antibiotic, the higher its concentration in the blood serum, and the more readily it penetrates the blood-brain barrier and a combination of antibiotics penetrates better than one antibiotic alone. The most effective method of introducing antibiotics into the blood is by an intravenous drop-by-drop technique or by an intracarotid apparatus. (10 refs.) - *M. Drossman.*

No address

121 INNES, J.R.M., STEWART, SARAH E., & LANDON, JOHN. Acute malacic and liquefying panencephalitis caused by an agent recovered from Burkitt's lymphoma. *Archives of Neurology*, 18(5):563-566, 1968.

Acute malacic and liquefying panencephalitis causing extensive cavitation was produced in baby *Macaca mulattas* by inoculation with an agent originally derived from Burkitt's lymphoma. The inocula were brain extracts from hamsters that developed neurologic symptoms after intracerebral injection of a concentrate from Burkitt's tumor biopsy and cerebral extracts from affected monkeys. The 11 monkeys tested showed no uniform survival time or neurological signs and of the 4 brains examined, 2 showed lesions as severe as in the human cases reported. The entire brain was damaged histologically and cavitated from pole to pole of the cerebral hemispheres. This pathology, which is identical to that observed in human herpetic necrotizing encephalitis, supports the theory that a herpes-like virus occurs in human Burkitt's lymphoma. (9 refs.) — *M.G. Conant.*

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Falls Church, Virginia 22046

122 JOHNSON, KENNETH P., & JOHNSON, RICHARD T. California encephalitis. II. Studies of experimental infection in the mouse. *Journal of Neuropathology and Experimental Neurology*, 27(3):390-400, 1968.

The infection of young and adult mice with California encephalitis virus was investigated by fluorescent antibody and histological methods. The phenomenon of increased host resistance with age was exhibited in mice, a phenomenon also found in humans. Adult and suckling mice were inoculated intracerebrally or subcutaneously with CEV-192 virus strain at 8, 15, 22, and 30 days of age and the cellular progression of infection during the incubation period was studied. Following subcutaneous infection, suckling mice showed early infection in mesodermal cells and subsequent central nervous infection through endothelial cells of cerebral vessels and parenchymal cells. Adult mice did not develop any central nervous system infection after subcutaneous inoculation; however, their central nervous system cells remained susceptible to the virus inoculated intracerebrally. Mesodermal tissues in general, and more specifically those cells at the site of inoculation seem to develop, with age, a resistance similar to the blood-brain barrier. (19 refs.) - *M.T. Lender.*

Department of Medicine
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123 CLARKE, C.A. Prevention of Rh haemolytic disease. In: MacKeith, Ronald, & Bax, Martin, eds. *Studies in Infancy*. London, England, Spastics International Medical Publications, 1968, p. 65-66.

Selected "high-risk" negative primiparae were given an injection of anti-D gamma globulin shortly after the delivery of an Rh positive ABO compatible baby in an attempt to mimic the natural protection ABO incompatibility affords an Rh negative woman bearing an Rh positive fetus so that she does not become sensitized to the fetal cells which are apparently destroyed by anti-A and anti-B factors in maternal blood. Of 80 women so treated, only 1 had transient immune antibodies present at least 6 months after delivery whereas 17 of 78 untreated controls had immune antibodies present. Among 40 second pregnancies, 5 of 13 untreated women produced immune antibody but none of the 22 women treated with anti-D gamma globulin produced antibodies against Rh positive fetal cells. (4 refs.) - *E.L. Rowan.*

124 KNOX, E.G., & WALKER, W. A working population model for haemolytic disease of the newborn. *Archives of Disease in Childhood*, 43(231):562-568, 1968.

A computer model for establishing a relationship between risk of sensitization of the mother to her fetus, and the incidence of hemolytic disease of the newborn in the population is presented. This relationship is dependent on the birth rank distribution of the population, the frequencies of the Rhesus and ABO genes, and risk weightings for ABO heterospecific pregnancies and R_2r pregnancies, and for their respective birth ranks. The Kleihauer test was found to lack discriminatory efficacy as a screening procedure for those isoimmunized after delivery and the test is dependent on a high sampling variance so it is doubtful that 50% of sensitizing pregnancies could be determined. The incidence of hemolytic disease may be reduced through this technique, but not dramatically until more accurate discrimination is achieved, or until treatment with anti-D gamma globulin is applied to a majority of women in a non-discriminating manner. (14 refs.) - *L.E. Clark.*

Department of Social Medicine
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125 DE WIT, C. DUDOK, & BORST-EILERS, ELS. Failure of anti-D immunoglobulin injection to protect against Rhesus immunization after massive foeto-maternal haemorrhage. Report of 4 cases. *British Medical Journal*, 1(5585): 152-154, 1968.

The use of anti-D immunoglobulin to protect against RH immunization has proven to be a very useful technique; however, in 4 cases of massive fetal-maternal hemorrhage, anti-D immunoglobulin injection failed to produce the desired result. Transplacental bleeds of 140 ml, 350 ml, 175 ml, and 180 ml were treated by injection of the mothers with 250 μg, 500 μg, 250 μ and 250 μg, respectively, of anti-D immunoglobulin after parturition. Nevertheless, within 2 months to 4 months later, all 4 Ss demonstrated Rhesus antibodies. Three possibilities for the failure are: the injections may have been given too late as the bleeds probably occurred some time before delivery; the dose of anti-D immunoglobulin may have been too low; or the anti-D

immunoglobulin may actually have enhanced the immune response, an effect found in experimental studies with animals. (10 refs.) - *K. Drossman.*

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126 Outlook in Rh-haemolytic disease. *British Medical Journal*, 1(5593):659-660, 1968. (Editorial)

The protection from Rh-hemolytic disease offered by anti-D gammaglobulin is remarkable; however, the safety of the procedure must be determined. Rh hemolytic disease will not immediately vanish because women who are presently immunized cannot be treated with anti-D gammablobulin, and it may be difficult to maintain an adequate supply of globulin. Difficulties may be encountered in the prophylaxis of other blood group incompatibilities. Nevertheless, the problems of neonatal hemolytic disease should be gradually reduced in the coming years. (11 refs.) - *M.T. Lender.*

127 STENCHEVER, MORTON A., & CIBILS, LUIS A. Management of the Rh-sensitized patient: A 3 year experience with amniocentesis and intrauterine transfusion. *American Journal of Obstetrics and Gynecology*, 100(4): 554-556, 1968.

Case histories of 85 white and 212 nonwhite patients were reviewed in order to draw conclusions about the management of the Rh-sensitized patient. In the cases reviewed, amniocentesis was performed with a No. 18 gauge spinal needle with a trocar, and the optical density (OD) was determined. Intrauterine transfusions were performed with packed cells from O Rh-negative donors. No hemolytic disease developed in the babies of 211 unsensitized clinic patients. One, 2 or 3 taps were performed on these patients. Of 19 Negro sensitized pregnancies, only 4 required exchange transfusions and no deaths occurred due to transfusion or isoimmunization which confirms previous reports that hemolytic disease is less severe in Negroes than in Caucasians. Of 57 Rh-positive babies and 13 Rh-negative babies, none of the Rh-negative babies had an OD greater than 0.10, but 24 of the Rh-positives had OD readings between 0.11 and 0.31+. Eight severely affected infants were given 1 to 4 intrauterine transfusions and 2 survived. The others were stillborn and had various degrees of erythroblastosis fetalis and hydrops. The first taps were performed between 22 and 28 weeks; however, earlier taps may have been more advantageous. The hazards of amniocentesis include the danger of damaging the placenta and that of injuring fetal vessels. The transfusion procedure is most useful in cases that have not become hydropic, and early delivery is sometimes the treatment of choice. (29 refs.) - *M.T. Lender.*

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128 QUEENAN, JOHN T., & GOETSCHEL, EMMANUEL. Amniotic fluid analysis for erythroblastosis fetalis. *Obstetrics and Gynecology*, 32(1):120-133, 1968.

An evaluation of 3 methods of amniotic fluid analysis was made on 360 amniotic fluid samples from 140 Rh-negative sensitized obstetric patients. Amniocenteses were performed between gestation weeks 20 and 40, and were done 1 to 9 times in each pregnancy. The 3 methods evaluated are: deviation in optical density at 450 mμ, corrected bilirubin method; and bilirubin-protein ratio. The data were charted onto graphs and the areas of intrauterine or neonatal death and of infant survival were indicated on graphs. The horizontal axis of the graph indicated the weeks of gestation. The size of the area of overlap of deaths versus survival determined the effectiveness of the test. The deviation of optical density at 450 mμ and the corrected bilirubin methods were most accurate; while the bilirubin/protein method was least accurate and most difficult to interpret. When values fell within the overlap area, serial determinations were needed to evaluate the fetal condition. (13 refs.) - *M.T. Lender.*

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129 DeVEBER, L.L. Treatment of mismatched transfusions in Rh-negative women with anti-D plasma. *Canadian Medical Association Journal*, 99(9):416-417, 1968.

Two Rh-negative women who were accidently transfused with Rh-positive blood were given large doses of anti-Rh plasma in order to prevent subsequent Rh immunization. One patient had a severe reaction to anti-Rh plasma; therefore, it is suggested that injections of Rh immunoglobulin may be preferable. In both cases Rh immunization was prevented. Fetal cell screening of all Rh negative patients to detect fetal-maternal transplacental bleeds is suggested so that immediate treatment can be instituted. (5 refs.) - *K. Drossman.*

Department of Pediatrics and
Pathological Chemistry
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130 DICKEY, RICHARD P., BESCH, PAIGE K., & ULLERY, JOHN C. Effect of intrauterine transfusion on maternal estrogen excretion. *American Journal of Obstetrics and Gynecology*, 102(2): 222-225, 1968.

Urinary estrogen levels were found to decrease in 5 women following intrauterine transfusion which indicates that determination of the extent of the decrease may be a method of estimating fetal distress following such procedures. The ratio of estrogen in micrograms/volume to creatinine in milligrams/volume (E/C R) was determined both before and after intrauterine transfusion. The E/CR decrease in the first 3 patients varied from 12% to 47%. Two infants died while the third survived following 2 post-partum exchange transfusions. The fourth patient revealed a 56% total estrogen and 66% E/C R decrease following

intrauterine transfusion but returned to pre-procedure levels 24 hours later; however, this infant also died. The fifth patient showed an even larger decrease, 63% and 76% respectively, possibly due to stress from improper catheter placement. A successful intrauterine transfusion of this infant 18 hours later caused the levels to decrease again and this infant also died. Since the fetus is known to be a participant in estriol synthesis, the placement of a catheter into its abdominal cavity may affect homeostasis so that adrenal function is affected and maternal estrogen levels decrease. (8 refs.) - *E. Gaer.*

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131 WELDON, VIRGINIA V., & ODELL, GERALD B. Mortality risk of exchange transfusion. *Pediatrics*, 41(4): 797-801, 1968.

A total of 351 exchange transfusions in 232 infants between 1957 and 1963 was reviewed in order to determine the mortality risk of the transfusions. The transfusions were performed by 72 pediatric house officers, supervised by 40 senior residents, and the procedure was that of umbilical vein cannulation in 338 of the transfusions. A death was recorded if the infant died within 6 hours from the time of transfusion. The total number of deaths was 11, with only 1 death occurring in a vigorous baby. Each of 3 moribund infants died. The weak, kernicteric, and hydropic groups had 2.8%, 33%, and 75% mortality rates respectively. The death of the vigorous infant was due to a procedural difficulty which involved the entrance of about 10 cc of air into the patient. Another patient died possibly from an infection which began in the umbilical cord. Nine other deaths could not definitely be attributed to procedure. The total case mortality and procedure mortality were 0.9% and 0.6%, respectively. The mortality rates were comparable to or lower than those reported by other workers, even though the number of practitioners was large. (20 refs.) - *M.T. Lender.*

Department of Pediatrics
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132 POWELL, L.C., JR. Intense plasmapheresis in the pregnant Rh-sensitized woman. *American Journal of Obstetrics and Gynecology*, 101(2):153-170, 1968.

The employment of intense plasmapheresis to lower Rh antibody titers in order to control fetal effects of the isoimmunization process was evaluated in 8 pregnant Rh-sensitized Ss. Ss had all had affected erythroblastotic infants previously. Intense plasmapheresis was given daily for 7-12 days, then biweekly until additional intensification was necessary. High protein diet was encouraged. Results indicated that intense plasmapheresis appeared to be a safe method even with large depletions of plasma and there were no adverse effects on the fetus. All patients whose protein levels dropped to an albumin level of less than 3.5 gm developed dependent edema. There were mild urinary infections in 2 patients and 3 patients showed persistent symptomatic upper respiratory infections which were difficult to clear. There was no significant thrombocylopenia in any of the studies. Analysis of vitamin levels showed overall rise in vitamin A, a fall in carotene and no change in B, B_2 or nicotinamide. There was an initial short-term reduction in Rh antibody titer with this method which appears promising but in almost all cases, the titer rises again in 2-4 weeks. In a few patients this could not be reduced in spite of increased plasmapheresis, antibody reducing substances, or intrauterine transfusion. Detailed data regarding blood chemistry, nutritional status, protein levels, and other biochemical changes were obtained. (22 refs.) - *B. Bradley.*

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133 BROWN, WILLIAM R., & BOON, WONG HOCK. Hyperbilirubinemia and kernicterus in glucose-6-phosphate dehydrogenase-deficient infants in Singapore. *Pediatrics*, 41(6):1055-1062, 1968.

Glucose-6-phosphate dehydrogenase (G-6-PD) activity in the umbilical cord blood of neonates in Singapore was assessed by dichloroindophenol screening test. Sixty-nine infants were found to be G-6-PD-deficient and 7 of them required exchange transfusions, with 2 eventually developing kernicterus. Plasma bilirubin values, which exceeded 19 mg/100 ml in 19% of these infants, all eventually declined to adult levels. Similarly, severe hyperbilirubinemia occurs in less than 0.3% of G-6-PD-normal Chinese infants. In the cord blood of G-6-PD-deficient infants, the mean hematocrit and hemoglobin concentrations were slightly lower and the reticulocyte counts slightly higher than in G-6-PD-normal neonates. This suggests that slightly excessive hemolysis superimposed on a moderately severe nonhemolytic hyperbilirubinemia causes hyperbilirubinemia in G-6-PD-deficient Chinese infants, with exposure to exogenous hemolytic agents of unassessed importance. Severe neonatal jaundice in G-6-PD-deficient members of an ethnic group may be influenced by their "baseline" or "physiologic" hyperbilirubinemia since incidence of this defect varies widely. (42 refs.) - *M.G. Conant.*

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134 HOWIE, R.N. Treatment of jaundice of immaturity with corticotrophin: A controlled trial. *Australian Pediatric Journal*, 4(1):23-28, 1968.

Corticotrophin therapy for hyperbilirubinemia was evaluated in 136 infants in 1964-1965. This particular treatment method did not appear to be beneficial; however, it also did no harm. Infants were selected by the criteria of: birth-weight 2,500 g or less; plasma bilirubin level at 48 hours age of 8.0 mg/100 ml or more; negative direct Coombs test; no apparent major congenital malformation; and no clinical evidence of infection. Infants were assigned alternately to a treatment or control group. Administration of corticotrophin consisted of 10 units intramuscularly twice daily until the bilirubin level was clearly falling

with subsequent decreasing dosage until discontinuation and 1/2 dosages for infants of birth-weight less than 1,500 g. Plasma bilirubin estimations were performed by the Powell method on heel-prick samples. More recent experience in Birmingham supports these conclusions. (5 refs.) - *W. Asher.*

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and Gynecology
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135 NATZSCHKA, J., GROTH, D., & BALLOWITZ, L. Protection from kernicterus by prednisolone in infant Gunn rats. *German Medical Monthly*, 13(9):443-445, 1968.

Prednisolone administration to Gunn rats with chronic hyperbilirubinemia showed a lower mortality and incidence of kernicterus than nontreated controls which indicates that corticosteroids may decrease the permeability of the blood-brain barrier to bilirubin in rats. A total of 169 rats from 20 litters were divided into 2 groups. Prednisolone hydrate at a dosage of 3 mg/kg daily for 4 consecutive days in the second and third week of life was given to one group while the control group received saline. Each group was then given an injection of sodium sulfadimethoxine. All the animals which died exhibited gross kernicterus. For all doses of sulfadimethoxine the mortality, incidence, and severity of kernicterus in the controls was higher than the treated rats. To rule out a possible prednisolone influence on plasma bilirubin levels, the latter was measured on both groups before and after sulfadimethoxine treatment. Since the levels in both were equivalent, it can be assumed that the same amount of bilirubin left the intravascular space in both groups. While corticosteroids may not be a prophylaxsis for kernicterus, the current study may shed more light on the problem, especially the role of the blood-brain barrier. (5 refs.) - *E. Gaer.*

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136 SAWITSKY, ARTHUR, CHEUNG, WAN HO, & SEIFTER, ELI. The effect of pH on the distribution of bilirubin in peripheral blood, cerebrospinal fluid, and fat tissues. *Journal of Pediatrics*, 72(5):700-707, 1968.

Altered acid-base levels were established in young rabbits, a concentrated solution of unconjugated sodium bilirubinate was administered intravenously, and the distribution of bilirubin was determined 2 to 3 hours later in the blood, cerebrospinal fluid, and fat tissue. Administration of sodium bilirubinate in controls produced no significant amounts of bilirubin in the spinal fluid or tissue fat, while bilirubin was detected in significant concentrations in animals previously rendered acidotic by administration of ammonium chloride, sulfisoxazole, and acetazolamide. Respiratory acidosis, induced by exposure to an atmosphere containing 20% carbon dioxide, produced markedly jaundiced tissue fat, but no bilirubin in the spinal fluid and metabolic and respiratory alkalosis, induced by administration of sodium bicarbonate and exposure to an enriched oxygen atmosphere, did not result in bilirubin concentration in the spinal fluid or tissue fat, unless a 100% oxygen atmosphere was used. The acidotic state favors the transport of the lipid soluble bilirubin across membranes and into the cerebrospinal fluid and tissue fat by depressing the dissociation of bilirubin. (22 refs.) - *M.G. Conant.*

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137 KOBAYASHI, AKIO, & SHIRAKI, KAZUO. Serum magnesium level in infants and children with hepatic diseases. *Archives of Disease in Childhood*, 42(226):615-618, 1967.

Serum magnesium levels in children were found to be significantly different in congenital biliary atresia, neonatal hepatitis, and other hepatic diseases. Furthermore, the serum magnesium level in congenital biliary atresia tended to decrease with age and was directly related to the serum albumin-γ-globulin ratio and serum cholesterol level and inversely related to serum bilirubin level. Such relationships were not found in neonatal hepatitis. Since the prognosis in congenital biliary atresia is poor while that in neonatal hepatitis is good, the ability to differentiate between the 2 on the basis of laboratory tests can be valuable. (12 refs) - *E. Gaer.*

Department of Pediatrics
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138 JACKSON, R.H., WALKER, J.H., & WYNNE, N.A. Circumstances of accidental poisoning in childhood. *British Medical Journal*, 4(5625):245-248, 1968.

Childhood poisoning requires epidemiological consideration because of its great incidence and the possibility of resulting in morbidity and adverse reactions. Of 377 childhood poisoning victims studied, 2/3 were 1 to 3 years of age, "only children" were significantly less frequently poisoned than those who had siblings, and no social class was significantly more immune than any other. The poisoning agents were classified as to type of container, open or closed, and site of storage. Of the 377 cases, the poison was in an inappropriate container in 27 instances, open in 41 instances, and in an inappropriate place in 170 cases. There were 14 cases of the poison being given to the victim by another person, 8 cases of sharing between 2 or more children, 6 cases of an adult offering the poison inadvertantly, and 22 cases of self-poisoning (suicidal). The substances taken were of great variety. The possible ways to reduce access to poisons are: reduce the quantity of drugs in the home; maintain a safe drug cupboard; use "child-proof" containers; make pills unattractive, white; and educate parents. In addition, all drugs should be labelled by name. (16 refs.) - *M.T. Lender.*

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139 BICKNELL, JOAN, CLAYTON, BARBARA E., & DELVES, H.T. Lead in mentally retarded children. *Journal of Mental Deficiency*, 12(4):282-293, 1968.

Lead poisoning in MR children was analyzed in terms of etiological factors, characteristics of pica, blood lead levels, and utility of the oral calcium ethylenediaminetetraacetic acid (EDTA) test. Three groups of Ss in a hospital for SMR children were selected and included children with pica, those with physical handicap without pica, and ambulatory children without pica. The pica group consisted of 24 children (CA mean 9.0 yrs; MA mean 15.6 mos) rated as so scavenging as to cause a management problem. Etiology of MR was undetermined in 12 of these children and data indicated that only 1 case with pica could be considered as a result of lead encephalopathy although there was a possibility in 1 additional case. The physically handicapped group consisted of 14 Ss who had been considered to almost never scavenge due to the fact that many of them could not place their hands to their mouth. The control or no pica group included 12 SMR children (CA mean 12.7 yrs; MA 2.3 yrs) who were ambulatory and attended hospital school classes. The oral calcium EDTA-lead excretion test was given to all groups, and results showed that there was excessive ingestion of lead in 70% of the Ss in the pica group. Moderately raised blood levels did not appear to be related to original etiology of MR. Characteristics of pica children reveal that pica may signify a behavior disturbance as well as accentuation of a specific developmental phase. Pica appears to be more prevalent in disturbed MR children and is highly motivated and selective even at low MA levels. The EDTA test seems to be useful as a supplement to other screening devices. (19 refs.) - *B. Bradley.*

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140 LIN-FU, JANE S. (Children's Bureau Publications No. 452, 1967.) Washington, D.C., Superintendent of Documents, U.S. Government Printing Office, 1967, 25 p. $0.15.

Although the etiology, pathogenesis, and epidemiology of lead poisoning are well known, each year lead poisoning cases continue to cause death, MR, cerebral palsy, epilepsy, and eye disorders in children in the United States. High risk areas are slums where old houses, flaking paint, and poor parental supervision are most common. Children 1 to 6 years of age are the most likely victims with 85% of the cases found between 1 and 3 years of age. Differential diagnosis of lead poisoning is extremely difficult in early stages; therefore, a complete family history is a necessity and treatment should be started on any child with a suggestive history or clinical symptoms or a high blood lead level. Large scale screening methods suitable for use in slum areas still need to be developed; however, the urinary excretion of coproporphyrin and the urinary delta aminolevulinic acid test can be used on a smaller scale. Some of the factors which contribute to the problem of lead poisoning are: dilapidated housing; lack of awareness about the problem among physicians; a poorly informed public; and inadequate prevention of re-exposure to lead. Control and prevention of lead poisoning will depend upon overcoming these factors. (37 refs.) - *M. Drossman.*

141 MIRANDO, E.H., & GOMEZ, MANEL. Lead poisoning in childhood in Ceylon. *Archives of Disease in Childhood*, 42(226):579-582, 1967.

Lead poisoning was diagnosed in 12 Ceylonese children—many of whom resided where lead contamination was prominent in the immediate surroundings as a result of commercial activities. These are generally located in slum areas where children are easily exposed to fumes, dust, and scrap. In 6 cases, the suspected lead source was from a business which refined jeweler's wastes. In 2 cases, the sources were businesses which reconditioned automobile batteries. Presenting symptoms included seizures, vomiting, gastrointestinal disturbances, and anemia. Laboratory findings included anemia, stippled erythrocytes, elevated serum and urinary lead, corproporphyrin III in the urine, and lead lines in long bone skiagrams. Furthermore, some of the children had a family history which was suspicious of lead intoxication for a sibling. During acute infections lead may cause febrile convulsions so this may be a presenting symptom, and in the tropics iron deficiency or parasitic infection may cause one to overlook this as a presenting sign of lead poisoning. (3 refs.) - *E. Gaer.*

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142 Children with hidden lead poisoning caught by their hair. *Medical World News*, 9(34):32-33, 1968.

Chemical analysis of urine for δ-aminolevulinic acid and spectrophotometric analysis of hair are 2 methods of screening for asymptomatic lead poisoning. It is estimated that 25 hidden cases may occur for each of the 12 to 16 thousand symptomatic cases reported annually in the United States, and brain damage may also occur in subclinical cases. Existing tests including urinary coproporphyrins are often ineffective as screening methods. In the first of the new techniques, hair samples are weighed and measured, then digested in acids and put through an atomic absorption spectrophotometer. Since hair growth is fairly constant, the time and duration of exposure to excess lead can be estimated. The second method depends on the presence of elevated urinary δ-aminolevulinic acid, which may remain 10 to 15 times normal for up to a year following lead poisoning. An ion exchange resin technique provides for fast, inexpensive extraction of the metabolite from urine. (No refs.) - *D.Martin.*

143 SILVER, WALTER, & RODRIGUES-TORRES, RAMON. Electrocardiographic studies in children with lead poisoning. *Pediatrics*, 41(6):1124-1127, 1968.

Electrocardiograms of 30 patients (CA 17 to 60 mos) diagnosed as having lead poisoning were analyzed to observe changes after treatment. There was no evidence of previous congenital or rheumatic heart disease in

these patients. Procedures involved taking 12 leads scalar ECGs before and after treatment for all patients. Results demonstrated that abnormal ECGs were found in 70% of the patients on admission but after therapy only 4 (or 13%) were considered to be abnormal. The more serious abnormalities occurred in patients with higher blood-lead levels. Abnormalities were considered to be indications of myocardial damage. Possible factors influencing the myocardium were inhibition of cardiac enzymes and/or production of interstitial serous exudate. The myocardial injury produced by lead poisoning in patients whose ECGs returned to normal after treatment appeared to be mild with an inflammatory reaction. The lack of a normal ECG after treatment is an indication of permanent myocardial injury. Routine ECGs are suggested in evaluation of children with lead poisoning. (16 refs.) - *B. Bradley.*

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451 Clarkson Avenue
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144 KIMBROUGH, RENATE D., & GAINES, THOMAS B. Effect of organic phosphorus compounds and alkylating agents on the rat fetus. *Archives of Environmental Health*, 16(6):805-808, 1968.

The organic phosphorus compounds, parathion, dichlorvos, and diazinon are somewhat teratogenic in rats when given in a single dose intraperitoneally on the eleventh day of gestation. Fetal malformations included omphalocele, hydrocephalus, adactylia, ectromelia, agenesis of the left ribs, and dilated renal pelvis. In addition, reduced fetal and placental weight as well as fetal edema were found. It is emphasized that the chemicals were given in large enough dosage to cause poisoning symptoms in the dams and for practical data on toxicity which can be extrapolated to humans, feedings studies rather than intraperitoneal injections would be a more practical approach. Decreased body weight of the fetus appears to be the most sensitive indicator of toxicity both for organic phosphorus compounds and for alkylating agents. (8 refs.) - *M. Drossman.*

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145 HOLTON, CHARLENE P., & JOHNSON, WARREN W. Chronic myelocytic leukemia in infant siblings. *Journal of Pediatrics*, 72(3):377-383, 1968.

Clinical, histological, and cytological features of the juvenile, Philadelphia chromosome negative (Ph^{1-}) form of chronic myelocytic leukemia in 2 sets of infant siblings are reported. The patients included a 2 11/12-year-old female and a 9-month-old male in one family, and a 2 1/2-year-old female and a 7-month old female in the second family, with this being the first report of familial occurrence of this disease. The disease was diagnosed in all the children under 1 year of age and all had moderately severe hepatosplenomegaly, protuberant abdomens, and hemoglobin F elevation and were easily bruised and susceptible to infection. In the 3 cases in which it was performed, splenectomy resulted in increased activity, weight gain, and relief of thrombocytopenia and anemia. Virus was not observed in electron microscope examination of bone marrow and spleen tissue and was not isolated in cell cultures. Cytogenetic studies on family members were normal. (11 refs.) - *M. G. Conant.*

St. Jude Children's Research Hospital
Memphis, Tennessee 38101

146 TENNENBAUM, JAMES I., ST.PIERRE, RONALD L., & CERILLI, G. JAMES. Dysgammaglobulinaemia type IV. *Lancet*, 1(7539):420-421, 1968. (Letter)

Case material was presented on a 24-year-old man with dysgammaglobulinemia type IV and associated cellular immunity deficiency without evidence of ataxia telangiectasia. He was MR without neurological abnormality. Evaluation of bronchiectasis revealed obstructive airway disease, mild chronic atopic dermatitis and clubbed fingernails. (1 ref.) - *J. Snodgrass.*

Ohio State University Medical School
Columbus, Ohio 43210

147 BRUENS, J.H., GUAZZI, G.C., & MARTIN, J.J. Infantile form of meningeal angiomatosis with sudanophilic leucodystrophy associated with complex abiotrophies: Study of a second family. *Journal of the Neurological Sciences*, 7(3):417-425, 1968.

Clinical and pathological features of cases of 2 siblings with a syndrome involving meningeal angiomatosis with sudanophilic leukodystrophy are described. The disease appeared during the first year of life and involved delayed psychomotor development, mental deterioration, and severe convulsions unresponsive to all types of therapy, with death occurring by the end of the second year. Microscopic examination of brain tissue revealed capillary-venous leptomeningeal angiomatosis, necrobiotic cortical areas of cerebral gyri, Ammon's horn, and cerebellar foliae, diffuse isomorphic fibrillary gliosis of cerebral and cerebellar white matter, sudanophilic leukodystrophy, and a systemic abiotrophic process involving areas of thalamus, cerebellum, and brain-stem. Two previously deceased siblings in the same family are thought to have died from the same autonomous abiotrophic process. (8 refs.) - *M.G. Conant.*

Department of Neuropathology
Born-Bunge Research Foundation
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148 HUTTENLOCHER, PETER R., & SMITH, DENNIS B. Acute infantile hemiplegia associated with thrombocytosis. *Developmental Medicine and Child Neurology*, 10:621-625, 1968.

Platelet clumping may be primary to thrombosis of the cerebral blood vessels as indicated by case studies of 2 acute infantile hemiplegic patients. A 13-month-old girl who had right-sided seizures, lethargy, irritability, and nearly twice the normal platelet count, improved with time and her platelet count returned to normal within 4 weeks. A second patient, a 2-week-old boy, had hyperkalemia and hyponatremia, lethargy, and irregular respiratory function. Gastrointestinal bleeding occurred and a colostomy was performed. A post-surgical platelet count was 1,000,000/cmm, and the ECG revealed an acute myocardial infarction, and left-sided focal seizures developed. The relationship between thrombocytosis and acute infantile hemiplegia presently is not clear, but platelet and thrombosis studies should be made on acute infantile hemiplegia patients. (25 refs.) - *M.T. Lender.*

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Trauma or physical agents

149 WINDLE, WILLIAM F. Brain damage at birth. *Journal of the American Medical Association*, 206(9):1967-1972, 1968.

Estimates indicate that there are 1/2 million victims of CP in the United States and approximately 6 million MRs, and these statistics do not include nearly 1/2 million children born yearly who may have minimum neurologic deficits. Data on 130 monkeys who were asphyxiated during or after birth were analyzed and behavior of this group was compared with nonasphyxiated control monkeys. Asphyxiation of the fetus in monkeys for more than 7 minutes always caused transient neurologic signs and often permanent brain damage. Neuropathology was limited to certain brain-stem centers associated with general body sensation and hearing but not with vision. Inferior colliculus and ventrolateral group of thalamic nuclei were considered to be the most vulnerable. Monkeys who were asphyxiated for 12 to 13 minutes showed rapid improvement but brains were found to be "riddled with focal lesions." Children who have signs of asphyxia, low initial Apgar score, require resuscitation and seem to recover still may have suffered brain damage. A group of 16 asphyxiated monkeys were studied in a longitudinal analysis to determine modifications of brain damage with time. These monkeys displayed marked neurological deficits after resuscitation. As the monkeys matured some neurologic deficits disappeared and they seemed to adjust to their handicap. At 1 to 3 years they appeared normal but lacked manual dexterity and were hypoactive. Analysis of brain tissue showed no structure "repair" in brain tissues. Instead, there was depletion of nerve cells in areas originally unaffected by asphyxia. Data showed that passage of time resulted in improved behavioral and physical characteristics but there was progressive deterioration of brain structure. (19 refs.) - *B. Bradley.*

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New York, New York 10016

150 HELLSTROM, BO., & SALLMANDER, ULF. Prevention of spinal cord injury in hyperextension of the fetal head. *Journal of the American Medical Association*, 204(12):1041-1044, 1968.

Case reports of cervical spinal cord injury resulting from the vaginal delivery of 2 infants with abnormal intrauterine position and hyperextension of the neck suggest Caesarean delivery might have averted neurological damage. Both cases were characterized at birth by respiratory distress and spinal shock and an obstructed spinal canal was demonstrated at a later date by oxygen myelography. In one case, neurosurgical exploration for cervical spinal cord tumor was performed and findings were consistent with traumatic hemorrhage. Survey of known cases indicates 7 of 17 cases of hyperextension received cervical cord injuries when delivered by the vaginal route while 11 cases delivered by elective Caesarean section were neurologically intact. Hyperextension of the fetal head demonstrated roentgenologically after labor has started should be an absolute indication for Cæsarean section. (18 refs.) - *W. Asher.*

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151 JURADO, LEOPOLDO, & MILLER, GERALD L. Breech presentation. *American Journal of Obstetrics and Gynecology*, 101(2): 183-189, 1968.

The analysis of 250 breech deliveries (3.3% of 7,541 consecutive births at Kansas City General Hospital) revealed several factors which contributed to the high perinatal loss of 18.8%. Prematurity complicating 41.6%, premature rupture of membranes in 17.3%, prolapse of the umbilical cord in 7.8%, and placenta

previa in 3.4% were all significantly higher than in vertex presentations. Cephalopelvic disproportion, an elderly primagravida, and uterine inertia were also high risks and most often required Caesarean section. When correction was made for the high proportion of prematurity and congenital malformations incompatible with life, the perinatal loss associated with properly managed breech delivery approached that associated with vertex presentation. (10 refs.) - *E.L. Rowan.*

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152 SWANSON, ALFRED B. Surgery of the hand in cerebral palsy and muscle origin release procedures. *Surgical Clinics of North America*, 48(5):1129-1138, 1968.

Selected surgical procedures may be of benefit in promoting better hand function in some patients with cerebral palsy. Success may be expected in an intelligent, cooperative, spastic hemiplegic patient with a volitional grasp and release pattern and reasonable sensitivity in the hand. Physical methods of stretching the wrists with casts or braces may relieve myostatic contractures. Flexion deformities of the wrist and/or fingers, thumb-in-palm deformities, and swan-neck deformities may be made more functional with selected muscle releases, tendon transfers, capsulorrhaphy, or arthrodeses. A careful preoperative evaluation, the selection of appropriate procedures, and a prolonged follow-up are necessary if intervention is to be successful. (24 refs.) - *E.L. Rowan.*

313 Blodgett Medical Building
Grand Rapids, Michigan

153 NISWANDER, KENNETH R., FRIEDMAN, EMANUEL A., & BERENDES, HEINZ. Do placenta previa, abruptio placentae and prolapsed cord cause neurologic damage to the infant who survives? In: MacKeith, Ronald, & Bax, Martin, eds. *Studies in Infancy*. London, England, Spastics International Medical Publications, 1968, p. 78-83.

Records of 17,265 births were analyzed and 891 cases with selected pathological conditions thought to be associated with perinatal hypoxia were compared with the group as a whole for subsequent brain damage as evidenced by neurological deficit. In both low birth-weight and normal groups, there was more depression of both 1 minute and 5 minute Apgar scores in test groups than in controls. The neonatal neurological exam also showed significantly more abnormalities in both low birth-weight and normal weight test groups than in controls; however, at 4-month follow-up, the only real difference was more "suspect" neurological findings in the low birth-weight test group and even these disappeared at 8- and 12-month follow-ups. Although low birth-weight itself is associated with later neurological deficits, the specific insults under consideration could not be implicated. (12 refs.) - *E.L. Rowan.*

154 EDSON, J. ROGER, BLAESE, R. MICHAEL, WHITE, JAMES G., & KRIVIT, WILLIAM. Defibrination syndrome in an infant born after abruptio placentae. *Journal of Pediatrics*, 72(3):342-346, 1968.

A case of a severe defibrination syndrome in a female neonate whose mother had abruptio placentae is presented. The premature infant weighed 2,100 g at birth, was given 1.0 mg aqueous vitamin K intramuscularly after birth, received a partial exchange transfusion and 200 mg fibrinogen, and died at 15 hours, after several cardiac and respiratory arrests. The fibrinogen level of the mother was abnormally low and that of the infant was unmeasurable, as were the levels of prothrombin and factor V. The infant also had hyaline membrane disease and a hemorrhagic diathesis. Defibrination results from intravascular coagulation caused by tissue entering the circulation from the placenta, through manipulation of the umbilical cord, or from tissues of the infant after prolonged hypoxia. In abruptio placentae, placental thromboplastin and/or tissue release by hypoxia may trigger intravascular coagulation. Neonatal defibrination syndromes must be treated immediately with transfusions of fresh whole blood or frozen plasma to replace deficient clotting factors and with heparin to arrest intravascular coagulation. (19 refs.) - *M.G. Conant.*

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155 SHEPHARD, FRANK M., JOHNSTON, RICHARD B., JR., KLATTE, EUGENE C., BURKO, HENRY, & *STAHLMAN, MILDRED. Residual pulmonary findings in clinical hyaline-membrane disease. *New England Journal of Medicine*, 279(20):1063-1071, 1968.

A follow-up study of 70 infants diagnosed as having clinical hyaline membrane disease as neonates showed that while most of the infants recovered without sequelae, there were some residual pulmonary problems. There was a 2:1 predominance of male infants which is considered typical of the sex distribution in most series. No significant differences in gestational age or birth-weights were found and race was related to the Caucasian-Negro ratio of nursery population. The infants in the nonrespirator group were considered less severely ill than those in the respirator group. Six of the 19 who required mechanical assistance had radiologic evidence of pulmonary fibrosis or lung overexpansion, or both, but only 2 showed evidence of frequent infection. Lung biopsies of these showed areas of peribronchial and aveolar fibrosis. It is concluded that the clinical, radiological, and pathological sequelae which do occur in some infants who have clinical hyaline-membrane disease may result from the reparative process of the lung to the perinatal insult which produced the original disease. (16 refs.) - *B. Bradley.*

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Tennessee 37203

156 CROMPTON, M.R., HUNTER, R., & JONES, MURIEL. Progressive multifocal leukoencephalopathy following cerebral anoxia due to asphyxia: Report of a case. *Journal of the Neurological Sciences*, 7(3):545-549, 1968.

A 45-year-old patient had a fatal episode of cerebral anoxia due to carbon monoxide asphyxiation with death occurring slightly more than 1 month following the episode. Microscopic examination of brain tissue revealed signs of progressive multifocal leukoencephalopathy, with white matter lesions containing large phagocytes and astrocytes. Large, basophilic oligodentroglial nuclei, characteristic of multifocal leukoencephalopathy, and pallidal necrosis characteristic of that caused by cerebral anoxia were observed. The superimposition of changes of progressive multifocal leukoencephalopathy upon those of cerebral anoxia has not been reported previously. (10 refs.) - *M.G. Conant.*

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London N 11, England

157 ORDY, J.M., SAMORAJSKI, T., HORROCKS, L.A., ZEMAN, W., & CURTIS, H.J. Changes in memory, electrophysiology, neurochemistry and neuronal ultrastructure after deuteron irradiation of the brain in C57BL/10 mice. *Journal of Neurochemistry*, 15(11):1245-1256, 1968.

Eighty C57BL/10 female mice were divided into 4 groups of 20 each, the first of which was sham-irradiated, while the others were irradiated with 500, 5,000, or 10,000 rads covering an area of 9 x 5 mm over the dorsal surface of the brain. Dark maze exploratory behavior and retention of locomotor performance was tested on 5 consecutive days of each month for 16 months after irradiation. The group receiving a dose of 10,000 rads showed a decrease in locomotor performance and increase in maze exploration on the first day of the testing period, but all rats were the same on the remaining 4 days, indicating that this dose level produced an impairment of retention. The group receiving 10,000 rads also showed desynchronization with an overall amplitude reduction of both spontaneous and light-evoked electro corticograms. Brain weight was reduced in the 5,000 and 10,000 rad groups, pituitary weight was reduced in all 3 groups, and brain protein, DNA, and RNA in various regions of irradiated tissue was observed. Electron microscope examination revealed serration of some nuclear membranes in the 10,000 rad group, glycogen accumulation and phagocytes, but no prominent synaptic changes. Deuteron irradiation thus provides another approach to the problem of relating learning and memory to cellular changes in the brain. (27 refs.) - *M.G. Conant.*

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Disease or disorders of metabolism, growth, or nutrition

158 NYHAN, WILLIAM L., ed. *Amino Acid Metabolism and Genetic Variation.* New York, New York, McGraw-Hill, 1967, 495 p. $22.50.

Among the disorders of amino acid metabolism in this book, heterogeneity is an apparent factor and is detectable in the clinical or chemical manifestations of the altered enzymes involved in phenylketonuria, tyrosinemia, histidinemia, branched-chain ketoaciduria, hyperoxaluria, hyperglycinemia, hyperlysinemia, prolinuria, and cystinuria. Some of the clinical variation is nonallelic, while some is allelic; some result in serious disease, while some result in no disease. Screening programs for detection of phenylalaninemia and the dietary treatment of this syndrome are controversial with respect to the identification of phenylalaninemia that is not phenylketonuria and with respect to the efficiency of diet therapy. The absence of a characteristic clinical and biochemical syndrome corresponding to these metabolic disorders makes classification, diagnosis, and treatment difficult, especially since there are so many problems encountered in studying liver enzymes in the laboratory. Aspects of amino acid nutrition relating to pre- and postnatal growth and mental development are discussed in detail. The question as to whether protein-calorie undernutrition leads to subnormal mentality has yet to be answered definitively. The observed wide human genetic variations in amino acid requirements and clinical and chemical manifestations of metabolic defects are analogous to the structural variations encountered in people. This book will be of interest to pediatricians, physicians, geneticists, psychologists, and biochemists. (849 refs.) - *M.G. Conant.*

CONTENTS: Phenylketonuria and Related Problems; Genetic and Enzyme Heterogeneity and Their Implications for the Investigation of Inborn Errors of Metabolism; Histidinemia; Branched-Chain Amino Acids; Urea Cycle and Lysine; Glycine; Homocystinuria; Transport of Amino Acids; Therapy; Amino Acids in Nutrition and Growth; and Screening for Metabolic Disease.

159 JERVIS, GEORGE A. Phenylketonuria. In: Nyhan, William L., ed. *Amino Acid Metabolism and Genetic Variation.* New York, New York, McGraw-Hill, 1967, Chapter 1, p. 5-9.

Some controversial aspects of phenylketonuria (PKU) are discussed. While it is known that the enzymic defect lies in the hydroxylation of phenylalanine to tyrosine, it is still unknown whether this pathway from phenylalanine to tyrosine is the only one available and whether the metabolic block is complete or incomplete. If variations in hydroxylase activity exist, there may be several distinct types of genetically determined defects of the same enzyme. Examples of atypical PKU are not rare. The efficacy of dietary treatment cannot be assessed without more extensive and better

experimental data. The effect of diet therapy was examined on 100 children under 6 years of age, 2/3 of whom presented with delayed psychomotor development and MR (Group 1) and 1/3 of whom had a family history of PKU or a positive ferric chloride test (group 2). After discontinuation of treatment at 5-7 years of age, 75% of the children in Group 1 showed no significant change in IQ, and the only result was prevention of further intellectual deterioration. Treatment was more effective in Group 2, but the patients were younger at the onset of treatment. (7 refs.) - *M.G. Conant.*

160 AUERBACH, VICTOR H., DiGEORGE, ANGELO M., & CARPENTER, GARY G. Phenylalaninemia: A study of the diversity of disorders which produce elevation of blood concentrations of phenylalanine. In: Nyhan, William L., ed. *Amino Acid Metabolism and Genetic Variation.* New York, New York, McGraw-Hill, 1967, Chapter 2, p. 11-68.

The disorder phenylketonuria (PKU) has been separated into several distinct variants which have in common elevated blood levels of phenylalanine during the neonatal period. Descriptions of 12 patients with phenylalaninemia who did not have classical PKU are given. Two patients had a defect of or delayed maturation of phenylalanine transaminase. They did not excrete phenylpyruvic acid, had normal levels of phenylalanine when fed ordinary amounts of protein, and did not require dietary treatment. Two patients had delayed maturation of p-hydroxyphenylpyruvic acid oxidase, with the phenylalanine level falling to normal after the first few months of life. Dietary therapy should be instituted but should be challenged at intervals. One patient had occult PKU, with the initial phenylalanine level below 4 mg/100 ml and increasing to around 30 mg/100 ml after the first few months of life. Three patients had atypical PKU, in which the blood levels of phenylalanine increase slower than in classical PKU. Intellectual development may be normal, even without diet therapy. Four of the patients described had unclassified phenylalaninemias, which may be combinations of one or more of the above disorders. Diagnostic problems, biochemical and genetic aspects, and therapeutic considerations were discussed. (84 refs.) - *M.G. Conant.*

161 ALLEN, RICHARD J., FLEMING, LADONIA, & SPIRITO, ROBERT. Variations in hyperphenylalaninemia. In: Nyhan, William L., ed. *Amino Acid Metabolism and Genetic Variation.* New York, New York, McGraw-Hill, 1967, Chapter 3, p. 69-96.

Biochemical observations on the phenylalanine tolerance levels of 10 phenylketonuric infants (Group 1) were compared with those on 5 neonates (Group 2) with hyperphenylalaninemia, 4 of whom also had tyrosinemia. Elevated blood levels were directly related to birth-weight which was low in all cases. An average phenylalanine intake of 117 mg/kg/24 hrs was required to produce elevated blood phenylalanine levels in Group 1, while in Group 2, an intake of 485 mg/kg/24 hrs did not produce increased urinary metabolites and blood phenylalanine levels characteristic of the classical homozygous phenylketonuric could not be obtained. It is important to determine individual phenylalanine tolerances in the homozygous PKU patient so that no excessive dietary restrictions are impossible Determination of the phenylalanine tolerance limit also accurately differentiates the homozygous and transient heterozygous states of PKU. Effect of treatment in the first 6 months of life in 14 babies at low phenylalanine levels was compared to that in 8 babies at adjusted tolerance levels. At 3 and 6 months of age, the latter group had weights above the fiftieth percentile while the former was at the 3rd percentile. There was no significant difference in blood phenylalanine at 6 months. (39 refs.) - *M.G. Conant.*

162 SHEAR, CAROL S., NYHAN, WILLIAM L., & TOCCI, PAUL M. Tyrosinosis and tyrosinemia. In: Nyhan, William L., ed. *Amino Acid Metabolism and Genetic Variation.* New York, New York, McGraw-Hill, 1967, Chapter 4, p. 97-114.

The literature on disorders of tyrosine metabolism is reviewed and clinical data on 3 patients are presented. Elevated tyrosine in the blood or excretion of tyrosine and its metabolites in the urine may be caused by either an inborn error of metabolism or by maturational delays. Presenting symptoms include failure to thrive, vomiting, diarrhea, hepatomegaly, and hypoglycemia, with MR and neurological abnormalities sometimes present. Monozygotic female twins showed elevated tyrosine levels and aminoaciduria at 2 weeks of age, unusual dermatoglyphics, and the presence of tyrosine, p-hydroxyphenyllactic acid, p-hydroxyphenylacetic acid, and phenylpyruvic acid in the urine. Tyrosine levels fell spontaneously to normal levels at 2 months of age without supplementary ascorbic acid and the twins developed normally. A male infant on a relatively low protein intake had severe hypoglycemia the first 2-3 weeks of life and normal tyrosine levels, but the latter reached 37.2 mg/100 ml at 9 weeks and remained slightly elevated until 64 weeks of age. These cases demonstrate individual variation in maturation of the liver enzyme systems. (54 refs.) - *M.G. Conant.*

163 LA DU, BERT N. Genetic variation in metabolic disorders. In: Nyhan, William L., ed. *Amino Acid Metabolism and Genetic Variation.* New York, New York, McGraw-Hill, 1967, Chapter 5, p. 121-130.

The study of liver enzymes and metabolism involves the problems of obtaining sufficient tissue and analyzing enzyme variants. The approach used to detect enzyme variants is described, using the hydroxylation of phenylalanine to tyrosine as an example. At the present time, only a few of the many causes of abnormal phenylalanine metabolism have been evaluated, but the biochemical basis for phenylketonuria will be completely assayed within 2 years. The understanding of metabolic diseases depends upon greater biochemical and enzymological knowledge of their genetic variations. (21 refs.) - *M.G. Conant.*

164 GHADIMI, H., & ZISCHKA, R. Histidinemia. In: Nyhan, William L., ed. *Amino Acid Metabolism and Genetic Variation.* New York, New York, McGraw-Hill, 1967, Chapter 6, p. 133-143.

Deficient or absent histidase activity is the biochemical abnormality resulting in histidinemia, which is generally

associated with a speech defect and sometime MR. The disorder is transmitted by a recessive mode and results in accumulation of histidine in various parts of the body, including the stratum corneum and liver, urinary excretion of imidazolepyruvic acid, imidazolelactic acid, and imidazoleacetic acid, high blood and urine concentrations of alanine, and low blood serotonin. The ferric chloride test is positive on the urine of histidinemic patients. The efficacy of early institution of a low histidine diet, with the concomitant lowered protein intake, is debatable. (24 refs.) - *M.G. Conant.*

165 AUERBACH, VICTOR H., DI GEORGE, ANGELO M., & CARPENTER, GARY G. Histidinemia: Direct demonstration of absent histidase activity in liver and further observations on the histidinemia disorder. In: Nyhan, William L., ed. *Amino Acid Metabolism and Genetic Variation.* New York, New York, McGraw-Hill, 1967, Chapter 7, p. 145-160.

Clinical studies on a previously reported patient with histidinemia and on 6 new patients in 2 different families are presented. The previously reported patient had alaninemia in addition to histidinemia and plasma levels of histidine and alanine fell to normal, with development of incipient megaloblastic anemia, while on a diet containing no histidine or serine. This patient and 1 of the new patients had no histidase activity in a liver biopsy specimen. The 6 new patients did not have alaninemia or any other clinical disturbance related to the biochemical finding. None had speech defects and all were of normal intelligence and were discovered as a result of routine urine screening. These findings indicate that there are at least 2 forms of histidinemia, with additional variations possible. (27 refs.) - *M.G. Conant.*

166 TOCCI, PAUL M., & BESSMAN, SAMUEL P. Histidine peptiduria. In: Nyhan, William L., ed. *Amino Acid Metabolism and Genetic Variation.* New York, New York, McGraw-Hill, 1967, Chapter 8, p. 161-168.

Imidazole excretion of 2 children with cerebromacular degeneration (juvenile Tay-Sachs disease) and imidazoluria was studied. Large and highly variable amounts of the dipeptides histidine, 3-methylhistidine, carnosine, and anserine, as well as smaller amounts of 1-methylhistidine are excreted. The amounts excreted are always larger than those of normal controls and do not change when the diet is radically changed, as those of the controls do. Studies using labeled histidine show increased synthesis and excretion of dipeptides in these 2 cases and minimum conversion of histidine as a result of histidine catabolism. (14 refs.) - *M.G. Conant.*

167 SNYDERMAN, SELMA E. Maple syrup urine disease. In: Nyhan, William L., ed. *Amino Acid Metabolism and Genetic Variation.* New York, New York, McGraw-Hill, 1967, Chapter 9, p. 171-183.

Very early diagnosis and dietary treatment of maple syrup urine disease may permit normal development. A female patient, sister of a known case of maple syrup urine disease, was fed from birth with a completely synthetic diet containing no leucine, isoleucine, or valine and plasma branched-chain amino acid levels fell to normal. At her present age of 7.75 years, the patient is small but well, with weight above the third percentile and neurologically intact, with a developmental quotient of about 70. An abnormality involving alloisoleucine is also present. Aside from biochemical control and survival, diet therapy results in normal tendon reflexes, less marked hypertonicity, spontaneous activity, and cessation of seizures. After plasma amino acid levels become stable, small amounts of milk and low protein natural foods can be added to the dietary regime. (16 refs.) - *M.G. Conant.*

168 DANCIS, JOSEPH. Intermittent branched-chain ketonuria. In: Nyhan, William L., ed. *Amino Acid Metabolism and Genetic Variation.* New York, New York, McGraw-Hill, 1967, Chapter 10, p. 185-189.

Two cases of a variant of maple syrup urine disease (MSUD) are described. Both show late onset of symptoms, intermittency of symptoms, and lack of permanent neurological damage. The activities of the enzymes responsible for decarboxylation of leucine and valine are considerably lower in these cases than in the normal controls and only slightly greater than those in classical MSUD. Decompensation may result from relatively minor events, as from a protein overload, variations in rate of protein synthesis, or unrecognized inhibitors. The amount of enzyme activity appears to be under genetic control, making possible a spectrum of enzyme activities and metabolic disorders. (5 refs.) - *M.G. Conant.*

169 GOEDDE, H. WERNER, & KELLER, WALTER. Metabolic pathways in maple syrup urine disease. In: Nyhan, William L., ed. *Amino Acid Metabolism and Genetic Variation.* New York, New York, McGraw-Hill, 1967, Chapter 11, p. 191-214.

Studies on human and cattle leukocytes and on cattle liver show that 3 specific oxidases (alpha-ketoisocaproic acid oxidase, alpha-ketoisovaleric acid oxidase, and α-keto-β-methylvaleric acid oxidase) are responsible for the degradation of the ketoacids derived from leucine, isoleucine, and valine. These acid oxidases are not identical with but function similarly to pyruvate and ketoglutarate oxidases. Determination of the activity levels of these 3 α-ketoacid decarboxylating enzymes in leukocytes obtained from members of 6 families in which children have died from maple syrup urine disease showed that the leukocytes of heterozygotes converted 1.4 to 1.8 millimicromoles of all 3 ketoacids while those of normal homozygotes converted 3-4 millimi cromoles. This method premits differentiation between these groups with a high rate of certainty. (38 refs.) - *M.G. Conant.*

170 EFRON, MARY L. Disorders of the ornithine-urea cycle. In: Nyhan, William L., ed. *Amino Acid Metabolism and Genetic Variation.* New York, New York, McGraw-Hill, 1967, Chapter 12, p. 219-224.

Argininosuccinic aciduria, citrullinemia, hyperammonemia, ornithinemia, and hyperglycinemia are 4 inherited disorders of the ornithine-urea cycle. Argininosuccine aciduria (deficiency of

argininosuccinase) is characterized by MR, ataxia, seizures, liver dysfunction, abnormally friable hair, and/or abnormal electroencephalograms. Large amounts of argininosuccinic acid are excreted. A deficiency of argininosuccinic acid synthetase causes citrullinemia, which is characterized by ammonia intoxication and liver dysfunction. Hyperammonemia, caused by deficiencies of ornithine transcarbamylase and carbamyl phosphate synthetase, is characterized by vomiting, attacks of screaming followed by lethargy, cortical atrophy, ammonia intoxication, and MR. Ornithinemia produces ammonia intoxication, refusal of protein foods, ataxia, and seizures. The metabolic defect is unknown. Ammonia intoxication, deficiency of carbamyl phosphate synthetase, lethargy, ketosis, and acidosis are present in idiopathic hyperglycinemia. This disorder responds to a low-protein diet, as does congenital lysine intolerance. (27 refs.) - *M. G. Conant.*

171 GHADIMI, H., & ZISCHKA, R. Hyperlysinemia and lysine metabolism. In: Nyhan, William L., ed. *Amino Acid Metabolism and Genetic Variation.* New York, New York, McGraw-Hill, 1967, Chapter 13, p. 227-234.

Lysinemia shows evidence of familial occurrence and its clinical manifestations include MR, physical retardation, lax ligaments and muscles, convulsions, and impaired sexual development. The biochemical anomaly associated with this syndrome was studied in dogs and in humans. In both cases, no indication of a cyclization step leading to production of pipecolic acid was found. *In vivo* studies of lysine metabolites in hyperlysinemic patients using labeled L-lysine showed the absence of α-ketoglutarate and acetate, the end products of lysine catabolism in normal humans. Similar studies on healthy human liver homogenate also produced no pipecolic acid, but large amounts of saccharopine instead, suggesting that in the presence of excess α-ketoglutaric acid, lysine degradation proceeds through formation of saccharopine. The metabolic block is probably in the catabolic pathway leading to α-ketoglutarate and acetate. (12 refs.) - *M.G. Conant.*

172 SMITH, LLOYD H., JR., & WILLIAMS, HIBBARD E. Hyperoxaluria (glycolic aciduria). In: Nyhan, William L., ed. *Amino Acid Metabolism and Genetic Variation.* New York, New York, McGraw-Hill, 1967, Chapter 14, p. 239-247.

Primary hyperoxaluria is a genetic disorder of glyoxylate metabolism characterized by the excessive excretion of oxalate resulting from expansion of the glyoxylate pool. Glycolic aciduria and, less frequently, L-glyceric aciduria are the 2 types of hyperoxaluria known. The major defect in primary hyperoxaluria is impaired transamination of glyoxylate to glycine, which involves the enzyme alpha-ketoglutarate:glyoxylate carboligase. Treatment involves either decreasing the tendency for stone formation or decreasing the urinary concentration of oxalate. An effective inhibitor of oxalate synthesis has yet to be found. (18 refs.) - *M.G. Conant.*

173 WILLIAMS, HIBBARD E., & SMITH, LLOYD H., JR. Hyperoxaluria (L-glyceric aciduria). In: Nyhan, William L., ed. *Amino Acid Metabolism and Genetic Variation.* New York, New York, McGraw-Hill, 1967, Chapter 15, p. 249-254.

A new form of hyperoxaluria which is clinically identical with primary hyperoxaluria is described. The disorder, L-glyceric aciduria, involves increased urinary oxalate, decreased urinary glycolate, and the presence of urinary L-glyceric acid, not previously described in biological material. Isotope studies indicated that the enzymatic block involves D-glyceric dehydrogenase (glyoxylate reductase), thus explaining both the decreased reduction of glyoxylate to glycolate and the decreased reduction of hydroxypyruvate to D-glycerate. Serine levels were normal in a patient with L-glyceric aciduria. (13 refs.) - *M.G. Conant.*

174 NYHAN, WILLIAM L., ANDO, TOSHIYUKI, & GERRITSEN, THEO. Hyperglycinemia. In: Nyhan, William L., ed. *Amino Acid Metabolism and Genetic Variation.* New York, New York, McGraw-Hill, 1967, Chapter 16, p. 255-265.

Hyperglycinemia involves a fundamental abnormality in the conversion of glycine to serine and is characterized by neutropenia, thrombocytopenia, osteoporosis, EEG abnormalities, and ketosis (ketotic type) and by developmental retardation, failure to thrive, spastic paraplegia, opisthotonos, seizures, and hypooxaluria (nonketotic type). Leucine, isoleucine, valine, threonine, and methionine can produce ketosis and associated symptoms in hyperglycinemia; therefore a low-protein diet is recommended. Experiments using labeled glycine in a hypooxaluric hyperglycinemic patient and 2 controls revealed that in the patient, there were defects in glycine oxidase and in the conversion of glycine to carbon dioxide and hydroxymethyltetrahydrofolic acid as well as to serine. (19 refs.) - *M.G. Conant.*

175 ANDO, TOSHIYUKI, & NYHAN, WILLIAM L. Glycine utilization and serine formation in individuals presumed to be heterozygous for hyperglycinemia. In: Nyhan, William L., ed. *Amino Acid Metabolism and Genetic Variation.* New York, New York, McGraw-Hill, 1967, Chapter 17, p. 267-271.

Dissolved glycine was administered orally (0.4 g/kg) in the fasting state to the parents of a nonketotic hyperglycinemic patient, the mother of a ketotic hyperglycinemic patient, and 3 healthy male adults. Heparinized blood samples were drawn at the time of glycine loading and after 1, 2, and 4 hours and the concentrations of glycine and serine in plasma were determined. The maximum concentration of glycine was lower in each heterozygote and its decline from peak levels was very slow in the parents of the nonketotic hyperglycinemic patient as compared with those of the other heterozygote and the controls. Plasma serine showed a rapid rise and rapid decline in the controls in contrast to a slow continuous increase in each heterozygote. These results suggest that serine formation in patients and in their heterozygous parents is abnormal and that the defect lies in the conversion of glycine to hydroxymethyltetrahydrofolate, resulting in decreased formation of serine. (12 refs.) - *M.G. Conant.*

176 SCHREIER, KURT. Glycinosis and different glycinurias observed in Europe. In: Nyhan, William L., ed. *Amino Acid Metabolism and Genetic Variation.* New York, New York, McGraw-Hill, 1967, Chapter 18, p. 273-276.

A female infant with hyperglycinemia had convulsions on the second day of life, developed hypotonicity, became lethargic, and died in respiratory arrest on the eighth day of life. Plasma glycine was 15-20 times normal and urinary glycine was 1 g/day. During recent years, several types of renal glycinurias have been observed, including glycoglycinuria (characterized by hyperglycinuria and glycosuria), renal glycinuria in vitamin D-resistant rickets, and hereditary deafness, nephropathy, hyperprolinemia, and glycinuria. Other cases of glycinuria include an infant with hyperglycinuria due to diminished reabsorption of glycine in the renal tubules and a familial oculorenal disorder with tubular hyperglycinuria. (21 refs.) - *M.G. Conant.*

177 PERRY, THOMAS L. Unsolved problems in homocystinuria. In: Nyhan, William L., ed. *Amino Acid Metabolism and Genetic Variation.* New York, New York, McGraw-Hill, 1967, Chapter 19, p. 279-296.

Homocystinuria is characterized by elevated concentrations of methionine and homocystine in the blood and urinary excretion of homocystine. The clinical syndrome includes mental deficiency, dislocation of the ocular lenses, skeletal abnormalities, and arterial and venous thromboses. In an attempt to elucidate alternate pathways of methionine, S-adenosylhomocysteine, 5-amino-4-imidazolecarboxamide -5'- S- homocysteinylriboside, and homolanthionine were identified as urinary methionine metabolites. A homocystinuric infant was treated successfully from the newborn period to 22 months with a low-methionine diet and supplemental L-cystine. No clinical manifestations of the disease have appeared. Treatment of 3 older children with homocystinuria with a daily dose of 500 mg pyridoxine produced no alteration in their abnormal plasma and urine levels of methionine and homocystine. The etiology of the abnormal collagen formation, the hypercoagulability of the blood, and the mental defect in this disease is unknown. (41 refs.) - *M.G. Conant.*

178 SCHIMKE, R. NEIL, MC KUSICK, VICTOR A., & WEILBAECHER, ROBERT G. Homocystinuria. In: Nyhan, William L., ed. *Amino Acid Metabolism and Genetic Variation.* New York, New York, McGraw-Hill, 1967, Chapter 20, p. 297-313.

Homocystinuria is an inborn error of metabolism involving the transsulfuration pathway and the absence of cystathionine synthase. It is characterized clinically by ectopia lentis, osteoporosis, thromboembolic phenomena, and often MR and biochemically by the urinary excretion of homocystine. Homocystinuria is inherited as an autosomal recessive disorder and preliminary estimates suggest that it may be relatively common. A number of low-protein low-methionine diets, with supplementary cystine, are in use, but preliminary results should be interpreted cautiously due to clinical variability within the group of patients. Long term effects of heparin anticoagulation administration are still unknown. (55 refs.) - *M.G. Conant.*

179 FRIMPTER, GEORGE W. Cystathioninuria. In: Nyhan, William L., Ed. *Amino Acid Metabolism and Genetic Variation.* New York, New York, McGraw-Hill, 1967, Chapter 21, p. 315-323.

Cystathioninuria is a rare defect of the transsulfuration pathway, the cause of which is as yet undetermined. The clinical picture is inconsistent, involving such varied features as MR, developmental abnormalities, mitral regurgitation, and convulsions. Some of the patients showed increased levels of brain cystathionine. In all patients tested, administration of vitamin B_6 resulted in decreased excretion and plasma concentration of cystathionine. Treatment with pyridoxal phosphate *in vitro* and vitamine B_6 *in vivo* increased cystathionase activity, suggesting a useful treatment. (30 refs.) - *M. G. Conant.*

180 SCRIVER, CHARLES R. Amino acid transport in the mammalian kidney. In: Nyhan, William L., ed. *Amino Acid Metabolism and Genetic Variation.* New York, New York, McGraw-Hill, 1967, Chapter 22, p. 327-340.

Study of the various aminoacidurias has led to increased knowledge of membrane transport of amino acids in the kidney. Amino acid transport sites fall into 5 group-specific systems (β-amino, α-amino, acidic, Neutral I, and Neutral II systems), the substrate preferences of which are non-overlapping. Investigation of a pedigree in which certain members have partial impairment of renal tubular absorption of the imino acids and glycine or of glycine alone seems to indicate two types of transport mediation; a group-specific type with high capacity and a low capacity type with greater specificity. This model also applies to other mutant amino acid transport phenotypes in man. (78 refs.) - *M.G. Conant.*

181 ROSENBERG, LEON E. Genetic heterogeneity in cystinuria. In: Nyhan, William L., ed. *Amino Acid Metabolism and Genetic Variation.* New York, New York, McGraw-Hill, 1967, Chapter 23, p. 341-349.

The biochemical and genetic studies which establish genetic heterogeneity in cystinuria are reviewed. Evidence for heterogeneity includes the presence of moderate excesses of urinary cystine and lysine in the parents and child of a cystinuric patient and demonstration of a gut transport defect in patients. There are at least 3 different mutations leading to a common clinical phenotype and pedigree studies indicated that multiple allelic mutations are involved. This means that 10 possible genotypes may be defined: normal homozygote, types I, II, and III heterozygotes, types I, II, and III homozygotes, and I-II, I-III, and II-III double heterozygotes. (26 refs.) - *M.G. Conant.*

182 LAMPERT, FRITZ, MAYER, HANS, TOCCI, PAUL M., & NYHAN, WILLIAM L. Fanconi syndrome in glycogen storage disease. In: Nyhan, William L., ed. *Amino Acid Metabolism and Genetic Variation.* New York, New York, McGraw-Hill, 1967, Chapter 24, p. 353-362.

Glycogen storage disease and the Fanconi syndrome were present continuously during observation from 1 to 5 years of age in a girl with dwarfism, hepatomegaly,

increased hepatic glycogen, vitamin D-resistant hypophosphatemic rickets, decreased activity of glucose-6-phosphatase, phosphaturia, proteinuria, and glycosuria. Chromatographic examination of the urine revealed a generalized renal aminoaciduria. Quantitative analysis of urine amino acids showed impaired utilization of galactose. The association of glycogen storage disease with a Fanconi syndrome in this and 2 other cases suggests the possibility of genetic linkage. (13 refs.) - *M.G. Conant.*

183 WAISMAN, HARRY A., & KERR, GEORGE R. Advantages and disadvantages in the use of restricted diets in the treatment of inborn errors of metabolism. In: Nyhan, William L., ed. *Amino Acid Metabolism and Genetic Variation.* New York, New York, McGraw-Hill, 1967, Chapter 25, p. 365-378.

The only practical treatment for inborn errors of metabolism is to limit the ingestion of the potentially harmful nutrient. The disadvantage of all restricted diets lies in the possiblity of some degree of undernutrition; however, their advantages, particularly in the case of disorders associated with profound MR or early death, greatly outweigh the disadvantages. Specific dietary restrictions are unnecessary in transient tyrosinemia but may be required in histidinemia. In homocystinuria, a low-methionine diet is used with supplementary cystine, which cannot be formed because of the enzymatic block. Phenylketonuria and maple syrup urine disease warrant initiation of restricted diets as early as possible, since optimum results depend upon early diagnosis. (28 refs.) - *M.G. Conant.*

184 HOLT, L. EMMET, JR., & SNYDERMAN, SELMA E. The amino acid requirements of children. In: Nyhan, William L., ed. *Amino Acid Metabolism and Genetic Variation.* New York, New York, McGraw-Hill, 1967, Chapter 26, p. 381-390.

Amino acid requirements of a normal infant are determined by feeding the infant a synthetic diet consisting of a mixture of 18 L-amino acids, decreasing the intake of 1 amino acid to the point at which weight gain and nitrogen retention are impaired, and then increasing to determine the amount that will just permit normal growth. Amino acids act in relationship with other amino acids and also with other nutrients and deficiencies are obvious within 1 to 2 days. Evidence indicates that both phenylketonuric and normal children need the same level of phenylalanine in the blood and require the same intake of phenylalanine. (27 refs.) - *M.G. Conant.*

185 FOMON, SAMUEL J., & FILER, L. J., JR. Amino acid requirements for normal growth. In: Nyhan, William L., ed. *Amino Acid Metabolism and Genetic Variation.* New York, New York, McGraw-Hill, 1967, Chapter 27, p. 391-401.

Twenty-two infants (12 males; 10 females) were fed a known amount of a milk-based formula providing 6% of the calories from protein. Weights and lengths were determined at 8, 14, 28, 42, 56, 84, and 112 days of age and compared with those of breast fed babies. During the experimental period, the 12 boys consumed an average of 1.26 to 1.83 g protein/kg/day, as compared to 1.36 to 1.60 g/kg/day consumed by the girls. All infants on the experimental formula showed normal rates of gain in length and all but 2 girls showed normal rates of weight gain. Nitrogen retention was somewhat greater for the 5 babies tested than for infants fed processed or fresh human milk. Serum albumin at 112 days was abnormal in 1 male and 1 female on the experimental formula, while the serum albumin in the other experimental infants was at or above the twentieth percentile value which occurred in breast fed infants. Three Ss showed abnormal performance on the regime. Nutrition was adequate in 19 cases in which the average amino acid intakes mg/kg/day were arginine 34-50, histidine 19-28, isoleucine 48-70, leucine 111-161, lysine 111-161, phenylalanine 42-61, methionine 23-29, cystine 9-13, threonine 80-116, tryptophan 11-17, and valine 64-93. (21 refs.) - *M.G. Conant.*

186 GRAHAM, GEORGE G. The significance of the first-limiting amino acid in human infant diets. In: Nyhan, William L., ed. *Amino Acid Metabolism and Genetic Variation.* New York, New York, McGraw-Hill, 1967, Chapter 28, p. 403-412.

A variety of infant diets was studied to determine the first-limiting essential amino acid at critical levels of protein intake. The minimum level of modified cow's milk protein which was adequate for an infant was determined and then the source of protein was changed to a soy isolate. Nitrogen retention declined for 9 days, after which supplementary methionine was added, resulting in slight nitrogen retention, indicating that methionine is first-limiting in soy protein. Similar study of other diets showed that in the same s[illegible] protein used with a full-fat soy flour, methionine and tryptophan were limiting, in wheat protein enriched with milk solids, lysine was first-limiting, and in wheat flour enriched with fish protein concentrate, emmethionine appears to be first-limiting. It was observed that amino acid supplements could prevent but not correct deficiency manifestations. (6 refs.) - *M.G. Conant.*

187 LOWE, CHARLES U., WEIL, WILLIAM B., JR., & KOCH, ARTHUR L. Preliminary evaluation of an in vivo model for determining the state of protein metabolism. In: Nyhan, William L., ed. *Amino Acid Metabolism and Genetic Variation.* New York, New York, McGraw-Hill, 1967, Chapter 29, p. 415-420.

A radioisotopic method of evaluating protein nutrition which avoids the complications of the nitrogen balance technique and which is very sensitive, appears to be feasible for use in humans. Two groups of 3 rats each were fed a high protein (60%) or low protein (15%) diet from 21 to 56 days of age. At age 50 days, 1 microcurie carbon-14-labeled glycine was injected and 3 days later, 1 microcurie carbon-14-labeled tyrosine was injected. After 24 hours, a urine sample was collected and the urinary amino acids were analyzed. The ratio of excreted glycine metabolite to excreted glycine was lower on a high protein diet than on a low protein diet

while the converse was true for the ratio of excreted tyrosine metabolite to excreted tyrosine (an essential amino acid). These changes suggest that the expression for glycine can be related to rate of anabolism for a nonessential amino acid and for tyrosine, to the rate at which an essential amino acid is used for protein synthesis. (1 ref.) - *M.G. Conant.*

188 PICOU, C., & WATERLOW, J.C. Metabolism of amino acids in malnutrition. In: Nyhan, William L., ed. *Amino Acid Metabolism and Genetic Variation.* New York, New York, McGraw-Hill, 1967, Chapter 30, p. 421-427.

Amino acid metabolism was studied in 4 male infants (1 with marasmus and 3 with kwashiorkor) in the malnourished state and after complete recovery. A solution of sulfur-35-labeled methionine in 5% glucose water was infused intravenously for 30 hours, during which time the urine was collected in 6, 8, 8, and 8 hour periods. The specific activities of total sulfate, inorganic sulfate, taurine, free cysteine, and methionine and the total radioactivity excreted were measured. In 2 cases, the specific activity of urinary methionine reached a constant level and 1 infant showed increased methionine turnover after recovering, while the other infant showed no change. In all 4 cases, the specific activities of cysteic acid and methionine showed wide variations and those of taurine and total sulfate were smaller. The rate of total protein synthesis was 1.3 to 4.0 g/kg/day. (3 refs.) - *M.G. Conant.*

189 KERR, GEORGE R., & WAISMAN, HARRY A. Transplacental ratios of serum free amino acids during pregnancy in the rhesus monkey. In: Nyhan, William L., ed. *Amino Acid Metabolism and Genetic Variation.* New York, New York, McGraw-Hill, 1967, Chapter 31, p. 429-437.

Products of conception in female Rhesus monkeys were delivered by Caesarean section at 50, 75, 100, 125, and 150 days of age and fetal and maternal levels of all serum amino acids were determined at these ages and at normal delivery. The fetal level exceeded that of the mother in all cases. Comparison of serum amino acid levels in full-term fetuses with those in 1-year-old monkeys and of levels in females at full-term delivery with those of non-pregnant females showed that levels of lysine, alanine, taurine, and 3-methylhistidine were elevated in the fetus and the elevated fetal level of the other amino acids was due to a reduced maternal level. Addition of supplementary phenylalanine to the maternal diet increased the phenylalanine level more in the fetus than in the mother. Apparently, the placenta will magnify any amino acid abnormality in fetal circulation. (12 refs.) - *M.G. Conant.*

190 CLEVELAND, W.W., ZACHMANN, M., SANDBERG, D.H., NYHAN, WILLIAM L., & WEHR, RICHARD F. Relationship of androgens and amino acids. In: Nyhan, William L., ed. *Amino Acid Metabolism and Genetic Variation.* New York, New York, McGraw-Hill, 1967, Chapter 32, p. 439-448.

Androgenic stimulation in humans resulted in increased plasma amino acid concentrations. Post-pubertal males showed significantly elevated plasma levels of glutamic acid, valine, methionine, isoleucine, leucine, and phenylalanine as compared with prepubertal males, while no significant difference was observed in muscle amino acid concentrations. Threonine, glutamine, glycine, valine, methionine, isoleucine, leucine, and tyrosine were significantly lower in plasma of untreated hypopituitary patients versus their siblings and, of all the amino acids, only proline and taurine were more concentrated in the hypopituitary Ss. Both testosterone and human chorionic gonadotropin increased the plasma amino acid levels in elderly men. Testosterone produced significant elevations in threonine, glutamic acid, and histidine while gonadotropin produced more marked changes, with significant elevations of serine, glutamic acid, valine, isoleucine, leucine, phenylalanine, and ornithine. In general, the essential amino acids in plasma were directly related to androgenic status of the S. (16 refs.) - *M.G. Conant.*

191 CRAVIOTO, JOAQUIN, DE LICARDIE, ELSA ROCA, & VEGA, LEOPOLDO. Amino acid-protein malnutrition and mental development. In: Nyhan, William L., ed. *Amino Acid Metabolism and Genetic Variation.* New York, New York, McGraw-Hill, 1967, Chapter 33, p. 449-458.

The relationship between neurointegrative behavior and nutritional status was examined in 2 groups of children (CA 6 to 11 yrs) of the same ethnic background. The groups represented the upper and lower quartiles by height of the total population of a rural school and these groups were compared with 2 similar groups from an urban school. Amino acid-protein malnutrition in the first 2 groups was defined, retrospectively, as a significant diminuation of height. Intersensory equivalence was evaluated in the vision, kinesthesis, and haptic touch systems by requiring the S to compare a standard form in 1 modality with variables in other modalities. Intersensory relations improved with age in both rural and urban children; however, the taller rural children consistently performed better than shorter children. No such difference was found in urban children, whose height was directly related to parental stature. Similarly, the ability to integrate auditory and visual stimuli was higher for the taller group of rural children than for the shorter group. Thus, there is evidence of delayed neurointegrative development in malnourished children. (32 refs.) - *M.G. Conant.*

192 TOCCI, PAUL M. The biochemical diagnosis of metabolic disorders by urinalysis and paper chromatography. In: Nyhan, William L., ed. *Amino Acid Metabolism and Genetic Variation.* New York, New York, McGraw-Hill, 1967, Chapter 34, p. 461-490.

The biochemical screening of populations with established disease is useful to uncover new diseases, to find examples of other genetic diseases of metabolism, to provide Ss for biochemical studies, and to delineate involved families. A screening program at the University of Miami was established to examine large numbers of patients suspected of having metabolic disorders and involves a number of simple qualitative tests used together with 1-dimensional paper chromatography. Tests to detect compounds including amino acids,

sugars, mucopolysaccharides, purines, pyrimidines, phenolic acids, simple organic acids, α-keto acids, peptides, indoles, imidazoles and lipids, proteins, and hemoglobin are currently being conducted upon request. Urine and blood specimens are used. Positive results obtained in the qualitative tests are confirmed using definitive quantitative assays. (43 refs.) - *M. G. Conant.*

193 PASIEKA, ARTHUR E., THOMAS, M.E., LOGAN, J.E., & ALLEN, R.H. Observations on methods for the detection of aminoacidurias. *Clinical Biochemistry*, 2(1):41-57, 1968.

Application of high voltage paper electrophoresis to amino acid analysis on 152 urine and serum samples at various acid-base equilibria and the use of specific staining reactions gave good results, at reasonable speed and cost, in the detection of aminoacidurias. Samples (5-20 μl) of concentrated urine were applied to 6 x 24 inch Whatman number 3 filter paper strips and subjected to 4,000 volts for 30 minutes (sample at pH 2.0), dried at 105°, and treated with ninhydrin reagent or specific reagents to give semi-quantitative results. Paper chromatography is useful for further work. Ion exchange automated chromatography will give quantitative results; however, it is not economically practical for use in mass screening. (25 refs.) - *M.G. Conant.*

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194 MARGOLIS, RENEE K., HELLER, ALFRED, & MOORE, ROBERT Y. Effects of changes in cellular composition following neuronal degeneration on amino acids in brain. *Brain Research*, 11(1):19-31, 1968.

Unilateral ablation of the visual cortex or combined enucleation of an eye and cortical ablation of the rabbit brain leads to nearly complete absence of neurons and glial reaction in the dorsal lateral geniculate body on the denervated side. The concentrations of γ-aminobutyric acid (GABA), glutamic acid, glutamine, and aspartic acid were studied after ablation with the normal side of the brain acting as the control. With cortical ablation, GABA concentration increased 30-33% while that of glutamic acid decreased 16%; with the combined lesion, the concentrations of glutamine and aspartic acid increased by 50% and 13%, respectively, while that of glutamic acid decreased 34%. In all cases, the total amino acid remained constant. Incorporation of glutamic acid-^{14}C in glutamine showed a significant decrease, as did glutamic-aspartic transaminase activity, and this may explain the altered glutamate and aspartate levels in the denervated dorsal lateral geniculate body. Incorporation of glutamic acid into GABA was comparable to tissue loss, indicating that glutamic acid decarboxylase may occur in normal nervous tissue in great excess. (27 refs.) - *M.G. Conant.*

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195 NYHAN, WILLIAM L. Clinical features of the Lesch-Nyhan syndrome. Introduction—Clinical and genetic features. *Federation Proceedings*, 27(4):1027-1033, 1968.

Clinical, neurological, behavioral, metabolic, genetic, and diagnostic information concerning the Lesch-Nyhan syndrome was collected during the past 3 years from more than 60 patients. The clinical and neurological manifestations included choreoathetosis, MR (IQ usually below 50), spastic cerebral palsy, and self-mutilating behavior, most commonly involving biting of the lips. Levels of uric acid in urine and blood are elevated, usually around 10 mg/100 ml in the serum, and about 40 to 50 mg/kg/day in the urine. Colchicine was used successfully as an anti-inflammatory agent for arthritis in 3 patients. Tophi, a symptom of gout, are also found in this syndrome. Studies with C-labeled glycine revealed an overproduction of purines (more than 20 times than that of the controls). A pedigree of 5 generations in 1 family suggests that the disease is due to an X-linked recessive character. (10 refs.) - *M.T. Lender.*

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196 NYHAN, WILLIAM L. Summary of clinical features. *Federation Proceedings*, 27(4):1034-1041, 1968.

Choreoathetosis, MR, compulsive self-mutilation, and hyperuricemia are the clinical characteristics of the Lesch-Nyhan syndrome; however, they often do not become evident until a certain stage of neurological development is attained. Hyperuricemia is not present in all cases; nevertheless, urinary uric acid is always elevated. MR is difficult to measure as speech difficulties are usually concomitant with choreoathetosis. The self-mutilation and aggressive activities of the children are varied, and cannot be controlled by reasoning. The syndrome can be mild as shown by 2 patients who are not destructive and who have some degree of coordination, but who are severely hyperuricemic and hypoxanthine-guanine phosphoribosyltransferase (HGP) deficient. The disease is usually found in males, but some females have 1 or more of the symptoms. A recessive X-linked inheritance is probably involved. X chromosome inactivation may occur and produce an afflicted female or a heterozygous gout-associated HGP partially deficient person may mate with a heterozygous carrier. Clinical signs in an infant include vomiting, orange crystals in the urine, hematuria, stones, polydipsia, polyuria, or any of the 4 major signs. The definition of gout, its relationship to arthritis, and the role of Lesch-Nyhan syndrome in both are not clearly defined; however, older Lesch-Nyhan Ss develop some gouty arthritis. (11 refs.) - *M.T. Lender.*

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197 HOEFNAGEL, DICK. Pathology and pathologic physiology: Summary. *Federation Proceedings*, 27(4):1042-1046, 1968.

Manifestations of the Lesch-Nyhan syndrome may be due to an abnormal or excessive metabolic byproduct or due to the absence of an enzyme. An original patient showed gouty nephropathy, no histopathology of the brain, and no demyelination at autopsy; however, neurological symptoms may occur in the absence of histological abnormalities. The same S had no hypoxanthine-guanine phosphoribosyltransferase (HGP) activity in his brain. Other autopsies had similar characteristics to this patient while some autopsies had contrasting conditions. Purine and catecholamine interaction may operate in the pathophysiology of the syndrome. An experimental model may be useful in the investigation of this disorder and a possible model is the self-mutilation behavior of rats given caffeine treatments. (4 refs.) - *M.T. Lender.*

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198 KELLEY, WILLIAM N. Enzymology and biochemistry: Hypoxanthine-guanine phosphoribosyltransferase deficiency in the Lesch-Nyhan syndrome and gout. *Federation Proceedings*, 27(4):1047-1052, 1968.

The enzyme hypoxanthine-guanine phosphoribosyltransferase (HGP), which catalyzes the formation of purine mononucleotides is absent in Lesch-Nyhan syndrome patients. The purine metabolism of 5 patients was studied with radiochemical assay procedures using guanine-8-^{14}C and hemolysate protein, under prolonged incubation. Blood, liver, and brain tissues either had no HGP activities or the HGP activities were less than 4% of normal. In previous studies, 4 patients had no HGP activity and 4 other Ss had no HGP activity in cultured skin fibroblasts. Decreased guanosine monophosphate (GMP) formation, defective HGP or other abnormal compounds may cause increased purine synthesis *de novo*. Azothioprine and allopurinol do not effectively inhibit *de novo* purine synthesis in Lesch-Nyhan patients. A recessive gene is assumed to be located on the X chromosome; however, HGP assays in erythrocytes have not demonstrated the heterozygous condition. Some gout patients have HGP activity, yet have excessive uric acid excretion. This indicates that the enzyme deficiency is not secondary to increased purine synthesis. (31 refs.) - *M.T. Lender.*

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199 HENDERSON, J. FRANK. Enzymology and biochemistry: Kinetic properties of hypoxanthine-guanine and adenine phosphoribosyltransferases. *Federation Proceedings*, 27(4):1053-1054, 1968.

The kinetic properties of hypoxanthine-guanine (HGP) and adenine phosphoribosyltransferases (AP) were studied in normal persons and in Lesch-Nyhan syndrome patients. Cells deficient in HGP contained a new variety of AP. The Michaelis constants of HGP and AP show that both enzymes have a high affinity for substrates. Other studies show that guanine and hypoxanthine share a common binding site on HGP. The activities of HGP, AP, and 5-phosphoribosyl-1-pyrophosphate (PRPP) amidotransferase are regulated by purine ribonucleotide inhibition and PRPP availability; AP can be inhibited by adenylate (AMP), and HGP can be inhibited by inosinate and guanylate (GMP). In addition, AMP and GMP are able to inhibit their own synthesis, and AP can be inhibited by GMP, doexyadenylate (dAMP), adenosine diphosphate and adenosine triphosphate. (10 refs.) - *M.T. Lender.*

University of Alberta
Cancer Research Unit
Edmonton, Alberta, Canada

200 SWEETMAN, LAWRENCE. Enzymology and biochemistry: Urinary and cerebrospinal fluid oxypurine levels and allopurinol metabolism in the Lesch-Nyhan syndrome. *Federation Proceedings*, 27(4):1055-1059, 1968.

Chromatography and enzymatic assays were used to determine whether xanthine or hypoxanthine is the more important precursor of uric acid in hyperuricemic patients. Four hyperuricemic children, 1 control child, and 1 gouty adult were studied. The studies were made with and without allopurinol treatments and cerebrospinal fluid (CSF) and urine samples were analyzed for uric acid precursors. The hyperuricemic children had hypoxanthine:xanthine ratios of 1.6 to 4.0:1, the control child had a ratio of 0.9:1, and the adult had a 0.3:1 ratio before allopurinol treatment. Allopurinol increased both purines 10 to 30 times, but the ratio became 1:1 in the hyperuricemia patients. The ratio in other Ss dropped to about 0.2:1. The results indicate that hypoxanthine is the major precursor of uric acid in hyperuricemic metabolism and that xanthine is the precursor in normal metabolism. Urinary allopurinol riboside was determined and found to be excreted at the rate of 72.8 mg/day in controls and at 0.43 mg/day in the hyperuricemic patient which is consistent with a lack of hypoxanthine-guanine phosphoribosyltransferase. Plasma and CSF studies revealed that when allopurinol is given, the CSF oxypurines come from the plasma and are not produced in the central nervous system (CNS), and that xanthine and uric acid are at normal levels in the CSF of hyperuricemic patients. There is a fourfold increase of hypoxanthine in hyperuricemic Ss; however, elevated hypoxanthine is not indicated as the cause for neurological damage. (12 refs.) - *M.T. Lender.*

Department of Pediatrics
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Miami, Florida 33146

201 ROSENBLOOM, FREDERICK M. Enzymology and biochemistry: Possible mechanism for increased purine biosynthesis de novo in Lesch-Nyhan syndrome. *Federation Proceedings*, 27(4):1063-1066, 1968.

Skin fibroblast cultures were used to study a possible mechanism for increased *de novo* purine synthesis in the

Lesch-Nyhan syndrome. The cells were obtained from controls and patients. The early parts of the pathway were studied by the addition of sodium formate-^{14}C, which forms formylglycineamide, a ribonucleotide. Normal and hypoxanthine-guanine phosphoribosyltransferase (HGP) deficient cells were examined for 5-phosphoribosyl-1-pyrophosphate (PRPP). The normal cells had 0.853 μ moles/g of PRPP and the HGP deficient cells had 3.59 μ moles/g. The ability of the cells to react to feedback inhibition was studied and it was found that adenine and 6-mercaptopurine ribonucleoside were able to inhibit purine biosynthesis *de novo* more efficiently in HGP deficient cells. Additional studies revealed that the adenosine phosphate ratios in the normal cells are different from those in the HGP deficient cells. The results indicate that increased rates of purine biosynthesis *de novo* occur in HGP deficient fibroblasts in tissue culture, in the presence of excess PRPP, and may be related to the mechanism of purine overproduction. (6 refs.) - *M.T. Lender.*

Department of Medicine
Yale University School of Medicine
New Haven, Connecticut 06510

202 BALIS, M. EARL. Enzymology and biochemistry: Aspects of purine metabolism. *Federation Proceedings*, 27(4):1067-1074, 1968.

Purine metabolism in hyperuricosuria affected patients differs from normal in respect to the relative amounts of xanthine and hypoxanthine excretion, as well as other factors. Affected persons excrete much more hypoxanthine in relation to xanthine, while the reverse occurs in normal metabolism. Several methods of assay for enzymes and intermediates have been useful in ascertaining the biochemical pathways. Bacterial or cell lysates, some of which contained radioactively labeled intermediates were reacted enzymatically and/or chromatographed, and/or examined for radioactivity. Hypoxanthine is rapidly synthesized through reactions involving adenosine monophosphate, adenosine, inosine, inosine monophosphate (IMP), in a potential cycle. The assay of IMP-pyrophosphate phosphoribosyltransferase indicated that hyperuricosuric patients have none or less than 10% of the normal amount of IMP-pyrophosphorylase, and that leukocytes are 500 times more able to transform purines into nucleotides than are erythrocytes with the same amount of phosphoribosyltransferases. Further radioautographic tests revealed that IMP-pyrophosphate phosphoribosyltransferase is not below normal values in the mothers of hyperuricosuria patients, even though the condition is X-chromosome linked. (25 refs) - *M.T. Lender.*

Sloan-Kettering Institute for
Cancer Research
Cornell University Medical College
Rye, New York 10580

203 HENDERSON, J. FRANK. Enzymology and biochemistry: Possible functions of hypoxanthine-guanine phosphoribosyltransferase and their relation to the biochemical pathology of the Lesch-Nyhan syndrome. *Federation Proceedings*, 27(4):1075-1077, 1968.

Hypoxanthine-guanine phosphoribosyltransferase (HGP) may have as many as 4 possible functions in metabolism, as discovered since the recognition of the Lesch-Nyhan syndrome. A possible function is in RNA metabolism, which may include purine 3'- and/or 5'-ribonucleotide intermediates. Other functions may be in inosine monophosphate (IMP) metabolism, which may be important in the brain, and perhaps the control of the rate of purine synthesis *de novo*. The most obvious possible function is in the metabolism of hypoxanthine and/or guanine from exogenous sources. It is possible that rapidly overproduced purines in the Lesch-Nyhan syndrome may cause the neurological dysfunctions either by substrate depletion or increased concentrations of purines. High uridine diphospho-*N*-acetylglucosamine concentrations may be involved with brain cell dysfunction. (9 refs.) - *M.T. Lender.*

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204 HOWELL, R. RODNEY. Enzymology and biochemistry: Hyperuricemia in childhood. *Federation Proceedings*, 27(4):1078-1082, 1968.

Since Type I glycogen-storage disease and mongolism are associated with hyperuricemia in childhood, research was reviewed in an effort to ascertain whether high serum uric acid concentrations can cause the neurologic damage associated with the Lesch-Nyhan syndrome. Because hyperuricemia in glycogen-storage disease can persist, if untreated, throughout the life of the patient and yet produce no MR or neurological dysfunction, it is clear that elevated serum uric acid does not cause neurologic damage. This fact might be explained by the supposition that Ss with glycogen-storage disease have a defect in nucleotide synthesis which might also exist in the Lesch-Nyhan syndrome. Little is known about the mechanism causing hyperuricemia in mongolism. However, some evidence indicates that the blood cells in mongolism have a shortened life-span; this may be associated with the increased nucleic acid breakdown. (23 refs.) - *A. Huffer.*

Department of Pediatrics
Johns Hopkins University
Baltimore, Maryland 21205

205 HENDERSON, J. FRANK. Epidemiology and genetic implications: Inheritance of hypoxanthine-guanine phosphoribosyltransferase deficiency and detection of heterozygotes. *Federation Proceedings*, 27(4):1085-1086, 1968.

Studies on 2 families affected with the Lesch-Nyhan syndrome revealed an X-chromosome linkage which is not usually manifested in obligate heterozygotes. In 78

members of the families, only 1 obligate heterozygote individual had the expected 50% of the normal hypoxanthine-guanine phosphoribosyltransferase (HGP) activity; however, 11 obligate heterozygotes were noted to have increased adenine phosphoribosyltransferase heat stability. (8 refs.) - *M.T. Lender.*

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206 BLAND, JOHN H., JARRETT, FRANCIS A., PLUNKETT, GEOFFREY E., RAVARIS, C. LEWIS, & SYLWESTER, DAVID. Epidemiology and genetic implications: Survey of serum uric acid concentration in an institutionalized mentally retarded population. *Federation Proceedings*, 27(4):1087-1090, 1968.

Institutionalized, MR, hyperuricemic individuals were studied to investigate any possible relationship between behavior patterns of the Lesch-Nyhan syndrome and behavior patterns of other hyperuricemic, MR individuals. Hypoxanthine-guanine phosphoribosyltransferase (HGP) studies were made to discover whether or not other cases of hyperuricemia were associated with HGP deficiencies. The HGP, cholesterol, and serum uric acid levels of 631 MRs (CA 3 to 73 yrs) were studied. Mean uric acid level was 4.63 mg/100 ml with a range of 0.50 to 10.6 mg/100 ml. The mean of male Ss exceeded that of female Ss by 0.72 mg/100 ml. Any level above 5.9 mg/100 ml was considered to be hyperuricemic. Mongolism was the condition most often associated with hyperuricemia. Feeding, dressing, and bowel and bladder control were negatively correlated with "destructive to self" and positively correlated with IQ. Ss' HGP and adenine phosphoribosyltransferase activities were within normal limits. No definite relationship was found between any behavioral pattern and hyperuricemia. (15 refs.) - *M.T. Lender.*

Department of Medicine
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Burlington, Vermont 05401

207 SEEGMILLER, J. E. Management and treatment: Lesch-Nyhan syndrome. *Federation Proceedings*, 27(4):1097-1098, discussion, 1098-1104, 1968.

The clinical aspects of Lesch-Nyhan syndrome hyperuricemia can be controlled; however, the neurological dysfunction does not respond to treatment. Gouty arthritis, calculi or sludge in the urinary tract, high levels of uric acid excretion, and nephropathy are serious results of hyperuricemia. Allopurinol inhibits xanthine oxidase and prevents the synthesis of uric acid and can be used as a successful treatment. Increased fluid intake must accompany the use of allopurinol in order to prevent xanthine stone formation. Successful neurological management methods have not been developed, but allopurinol treatments commencing at birth may be advantageous. (9 refs.) - *M.T. Lender.*

National Institute of Arthritis and Metabolic Diseases
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208 HENDERSON, J. FRANK. Summary and conclusions: Unanswered questions: Rational approaches to the treatment of the Lesch-Nyhan syndrome. *Federation Proceedings*, 27(4):1105-1106, 1968.

The administration of antimetabolities or depleted substrates are possible rational approaches to the treatment of the Lesch-Nyhan syndrome. It is not yet known if the neurological manifestations can be reversed or prevented through treatment, but it is possible that several treatment agents may be needed in addition to allopurinol, and it may be necessary to insure that the substances reach the brain after parenteral administration. New knowledge about the biochemical aspects of the syndrome and the development of substances which can penetrate the blood-brain barrier may bring about a definitive rational approach to the treatment of the Lesch-Nyhan syndrome. (No refs.) - *M.T. Lender.*

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209 BLUESTONE, RODNEY. Nyhan-Lesch syndrome and juvenile gout (two cases). *Proceedings of the Royal Society of Medicine*, 61(11, Part 1):1119-1120, 1968.

A 5-year-old male with Lesch-Nyhan syndrome had characteristics similar to those of a 24-year-old man with juvenile gout. The boy had a confirmed deficiency of hypoxanthine guanine phosphoribosyltransferase (HGPR), showed compulsive self-destruction, had renal failure and hyperuricemia, and was EMR. The man had partial HGPR deficiency (about 0.5 to 1.0% of normal), hyperuricemia, gout, mild cerebral disorder, and an IQ of 74. The metabolic disorder in the 2 patients is probably the same—expressed in 1 S as a more severe form found in childhood and in the other S, a milder form occurring in adulthood. (2 refs.) - *M.T. Lender.*

Royal Postgraduate Medical School
London, England

210 WADA, YOSHIRO, ARAKAWA, TSUNEO, & KOIZUMI, KINJIRO. Lesch-Nyhan syndrome: Autopsy findings and in vitro study of incorporation of ^{14}C-8-inosine into uric acid, guanosine-monophosphate and adenosine-monophosphate in the liver. *Tohoku Journal of Experimental Medicine*, 95(3):253-260, 1968.

A 5-month-old boy, admitted to the hospital because of rigidity of extremities, convulsions, and fever was determined to have the Lesch-Nyhan syndrome. Self-mutilating behavior began at 1 year, 7 months, and the child died of pneumonia at 1 year, 9 months. At autopsy, the brain was discovered to be an extremely dilated bag with a very thin cerebral mantle, the medulla was atrophied, and the cortex showed degenerative and necrotic changes. Liver homogenates possessed a markedly increased formation of uric acid and xanthine

from inosine while the formation of guanosine monophosphate, adenine, and adenosine was decreased. These results support the hypothesis that the primary disorder of the Lesch-Nyhan syndrome is a lack of hypoxanthine-guanine-phosphoribosyl transferase activity. (7 refs.) - *K. Drossman.*

Department of Pediatrics
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Tohoku University
Sendai, Japan

211 HOOFT, C., VAN NEVEL, C., DE SCHAEPDRYVER, A.F. Hyperuricosuric encephalopathy without hyperuricaemia. *Archives of Disease in Childhood*, 43(232):734-737, 1968.

A 3-year-old female presented with retarded psychomotor development, hypertonicity, generalized hyperreflexia, dysarthria, and self-destructive behavior. Urinary excretion of uric acid varied from 35 to 45 mg/kg daily, blood uric acid was always normal, and after intravenous administration of labeled glycine, specific activity was maximal at 120 hours and the cumulative excretion after 7 days was 1.7% of the injected dose. Institution of a low-purine diet resulted in improved appetite, weight gain, decreased self-destructive urge, and improved psychomotor ability. This case of hyperuricosuric encephalopathy differs from the classical cases with hyperuricemia in that the patient is a girl, her parents are first cousins, and no other members of the family were affected. This disease is probably inherited as an autosomal recessive trait. (14 refs.) - *M.G. Conant.*

Pediatric Department
University of Gent Medical School
Gent, Belgium

212 Population screening by Guthrie test for phenylketonuria in South-east Scotland. *British Medical Journal*, 1(5593):674-676, 1968.

All newborn infants in the Southeastern Scotland Hospital Region were screened for phenylketonuria with the Guthrie test on the sixth day of life or soon afterwards. Blood was obtained by heel-stick in the nursery or at home by a visiting nurse and mailed to a central laboratory. The convenient, inexpensive, 1-stage test was acceptable to physicians, nurses, and parents and apparently reliable as a test series of 20 known positives were all identified. The Guthrie test system could be expanded to screen for other inborn errors of metabolism and appears to be the best screening procedure available for use in a large and heterogeneous geographical area. (17 refs.) - *E.L. Rowan.*

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17 Hatton Place
Edinburgh 9, Scotland

213 MEDICAL RESEARCH COUNCIL WORKING PARTY ON PHENYLKETONURIA. Present status of different mass screening procedures for phenylketonuria. *British Medical Journal*, 4(5622):7-13, 1968.

A direct comparison was made of the 4 mass screening procedures for detection of phenylketonuria (Phenistix test on urine, paper chromatography on urine, modified Guthrie test on urine, and Guthrie test on blood) on 21 children with PKU, 9 of whom were related to known cases and 12 of whom were detected by routine screening. The Phenistix test was not reliable at 1 to 2 weeks of life, giving 25% to 50% false negatives and is still not fully efficient at 4 weeks. The modified Guthrie test on urine also gave negative results at 4 weeks (1 out of 15), but both paper chromatography on urine and the Guthrie test on blood were fully efficient from age 7 days. It appears that the Guthrie test on blood would be the most satisfactory to replace the Phenistix test; however, both the paper chromatography on urine and the modified Guthrie test on urine are adaptable to screening for a variety of other metabolic disorders. (24 refs.) - *M.G. Conant.*

No address

214 Screening tests for phenylketonuria. *British Medical Journal*, 1(5593):656-657, 1968. (Editorial)

The Guthrie test for mass screening of phenylketonuria (PKU) in newborn infants was found to be satisfactory in Scotland. Surveys indicate that PKU in predominant European stock is more common than thought and has a probability of 1/10,000 population. Thus, mass screening is of great value. The Phenistix test has been widely used and is usually done at 6 weeks of age; however, contact with some of the infants was lost by that time and permanent damage had occurred. The most widely used method is the Guthrie blood test which can be administered early in life and can be used for other metabolic disorders. Confirmation of the diagnosis in infants with a positive test should be done in a hospital where adequate facilities are available and a precise determination of the serum levels can be made. Serum phenylalanine is somewhat raised in 1 of every 4 premature and 1 of every 500 full-term infants, yet in these cases, the level will return to normal within a few days. The length of dietary treatment of PKU is most important and for good results should commence prior to age 6 months—preferably under 3 months. A rigid diet should continue at least until school-age with regular psychological testing to determine any intellectual deterioration or impairment. (12 refs.) - *S. Half.*

215 Screening for phenylketonuria. *Canadian Medical Association Journal*, 99(4):191, 1968. (Editorial)

The Guthrie blood test, when used in mass screening for phenylketonuria (PKU) within 5 days of birth, appears to be the most effective means of testing the largest possible number of cases, of obtaining the most reliable results, and of preventing and controlling PKU most economically. Sixteen other inborn errors of

metabolism can be detected by this test including maple syrup urine disease, histidinemia, and galactosemia. Locality is a relevant factor in the prevalence of PKU, and the ratio in Ireland (I:4,490) is high compared with that of the United States (1:10,000); even lower ratios exist in some African countries. (4 refs.) - *J.P. West.*

216 KANE, ROGER B., KRATKA, HAROLD B., & KATZ, MERVYN. Sources of error in testing for PKU. *Pediatrics*, 41(6):1146, 1968. (Letter)

A PKU ferric chloride test was definitely positive on the wet diaper of a baby whose physical examination showed him to be normal. This reaction was found to result from an ointment containing iodochlorhydroxyquin which had been applied for diaper rash and which is in common use. The ferric chloride test was negative when applied to the baby's wet diaper after no ointment had been used. (No refs.) - *E.F. MacGregor.*

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217 CASTELLS, SALVADOR, LaCAMERA, ROBERT G., WESSEL, MORRIS A., & BRANDT, IRA K. Transient hyperphenylalaninemia. *Journal of Pediatrics*, 72(4):530-533, 1968.

A 6-month-old male child with a positive ferric chloride test, a plasma phenylalanine level of 12.9 mg/100 ml, and a high average score upon psychometric evaluation, was determined to be hyperalalaninemic. The child was placed on a low-phenylalanine diet, and at 24 months of age, he was still in the same psychometric range; therefore, he was tried on a normal diet. Since his plasma phenylalanine did not rise above 5 mg/100 ml, the normal diet was continued. Subsequent tests revealed no abnormalities except an EEG with a "diffuse paroxysmal disturbance," consistent with seizure activity, at 3 years, 8 months of age. Studies on his mother indicated that both mother and propositus were homozygous normal for the phenylalanine hydroxylase allele. Low-phenylalanine diets should be used in similar cases of transient phenylketonuria. (9 refs.) - *M.T. Lender.*

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218 MYERS, HOWARD M., DUMAS, MICHAEL, & BALLHORN, HILDE B. Dental manifestations of phenylketonuria. *Journal of the American Dental Association*, 77(3):586-588, 1968.

The incidence of enamel hypoplasia was extremely high in a sample of 35 profoundly MR institutionalized patients with phenylketonuria (PKU); however, the severity of the defect could not be correlated with the level of serum phenylalanine. The range of defects was significantly higher than that found in MRs without PKU as reported by other investigators. The incidence of malocclusion, although higher than enamel hypoplasia in PKU patients, was not significantly different from the control population. Occasional findings of macroglossia, salivary excess, and supernumerary or missing teeth were noted as part of the PKU syndrome. (9 refs.) - *E.L. Rowan.*

School of Dentistry
University of California Medical Center
San Francisco, California 94122

219 BESSMAN, S.P., LOGUE, DORA DUE, & WAPNIR, R.A. Phenylketonuria—Certainty versus uncertainty. In: Richards, B.W., ed. *Proceedings of the First Congress of the International Association for the Scientific Study of Mental Deficiency*, held September 12-20, 1967, Montpellier, France. Surrey, England, Michael Jackson Publishing, 1968, p. 182-193.

Current information on other chemical abnormalities in phenylketonuria (PKU) does not support the belief that an excess of phenylalanine either directly or indirectly affects mental function. The metabolism of phenylalanine, indolering compounds, and tryptophan is abnormal in PKU patients and it is not known whether the mental lesion is due to the excess phenylalanine or a deficiency of an important intermediate. Examination of 3 children with chemical PKU, only 1 of which was MR, showed that all excreted abnormal amounts of hydroxyphenylacetic acid and that the MR child excreted less phenylpyruvic acid than the others and much more 5-hydroxy-indoleacetic acid. All 3 children would have been positive on a PKU screening test and would potentially have been placed on a restricted diet, while only 1 eventually became MR, thus supporting questions as to the validity of screening tests and restrictive diet therapy. (No refs.) - *M.G. Conant.*

220 PKU women have affected infants: Birth control advised. *Journal of the American Medical Association*, 204(8):27, 1968.

A study of 25 infants born to PKU mothers with serum phenylalanine levels above 200 mg/100 ml revealed that intrauterine growth retardation occurred to some degree in all Ss and continued throughout life. Thus far, only 1 known case exists in which an intellectually normal non-PKU infant was born to a PKU mother. PKU women, even those with normal intelligence, are advised against having children. (No refs.) - *J.P. West.*

221 WAISMAN, H. A. A ten-year longitudinal study on phenylketonuria. In: Richards, B. W., ed. *Proceedings of the First Congress of the International Association for the Scientific Study of Mental Deficiency*, held September 12-20, 1967, Montpellier, France, Surrey, England, Michael Jackson Publishing, 1968, p. 224-228.

Long-term treatment (10 years) of nearly 40 cases of classical phenylketonuria (PKU) indicated that, for optimum physical development and intellectual level, the plasma phenylalanine level should be maintained between 2.5-7.0 mg %. Twenty-two diet-treated PKU

children had significantly lower IQ scores than their 44 unaffected siblings and their age at the beginning of treatment was highly correlated with initial IQ. The mean IQ scores of 6 untreated children declined while those of both early and late treated cases increased; however, the rate of mental development during treatment was not related to age at the start of treatment. The time of special diet discontinuation should be individualized according to the personality of the child and the mother. (5 refs.) - *M.G. Conant.*

222 PINEDA, G. Variability in the manifestations of phenylketonuria. *Journal of Pediatrics*, 72(4):528-530, 1968.

Two siblings with phenylketonuria were given a diet which contained 20 mg/kg of phenylalanine. One child developed mild hypochromic anemia with no other notable effects, and her phenylalanine level stabilized at 5 mg %. The other child developed hypochromic anemia with a hemoglobin level of 6 gm %, poor weight gain, vomiting, and refusal to eat. This child had retarded motor development and failed to thrive. As her phenylalanine level was below 3 mg %, her phenylalanine intake was increased to 50 mg/kg/day, then to 60 mg/kg/day, and ultimately to a regular diet. Her development proceeded at a faster rate while on the regular diet and her phenylalanine level ultimately adjusted to 17 to 20 mg %. Diet therapy should be discontinued if adverse side effects begin to develop in a patient. (8 refs.) - *M.T. Lender.*

Department of Neurology
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223 Dietary treatment of phenylketonuria. *British Medical Journal*, 4(5624):135, 1968. (Editorial)

A study, conducted jointly by the United States and Great Britain, of 112 PKU children (using unaffected parents or siblings as control Ss) concluded that IQ can be improved by utilization of low-phenylalanine diets; that early treatment is important; but that assurance of normal intelligence is impossible. Eight groups, determined by age at commencement of treatment (youngest, 0-1 mo; oldest, 48-72 mos), were used. A similar study in Toronto (Canada) showed that IQ is likely to be above 70 if Ss are treated during the first 2 months of life. The possibilities of treatment being harmful in isolated cases, of IQ development being delayed by "overtreatment", or of the child's intellectual capacity being adversely affected by family anxiety due to the necessity of strict adherence to the diet, are recognized and further study is encouraged. (3 refs.) - *J.P. West.*

224 Usual PKU diets may be too strict. *Medical World News*, 9(22):26, 1968.

A study of 28 PKU infants demonstrated the ineffectiveness of phenylalanine deprivation in the prevention of MR. Nineteen Ss received "Lofenalac" formula and whole milk containing only 25 mg to 50 mg of phenylalanine/kg of body weight/day. Three infants suffered "profound" malnutrition within 5 months; 2 of these responded to whole milk supplements and are normal to low-normal in mental capacity; 1 is MR. A follow-up study 2½ years later indicated that of the remaining 16 Ss, 4 had normal intelligence, 7 were dull-normal, 2 were borderline, and 3 were MR. Even though no MR existed among 9 Ss on liberal diets (7 normal; 1 dull-normal; and 1 borderline), the results are not conclusive because the age of the Ss prevents accurate IQ measurement. (No refs.) - *J.P. West.*

225 HANSEN, HOLGER. Phenylketonuria. *British Medical Journal*. 2(5601):367, 1968. (Letter)

Challenging remarks concerning the relationship between early dietary treatment of phenylketonuria (PKU) and MR are presented. The merits of low-phenylalanine diets remain unproven, and dietary treatment of atypical PKU in infancy is disputed by 2 illustrated cases—1 infant matured normally to adulthood, the other infant was normal until stricken with epilepsy at age 9 years. Because 37 states require mass screening for PKU, present studies and research efforts in dietary treatment of PKU are under careful scrutiny. (7 refs.) - *J.P. West.*

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New York, New York 10032

226 WADMAN, S. K., VAN SPRANG, F. J., MAAS, J. W., & KETTING, D. An exceptional case of tyrosinosis. *Journal of Mental Deficiency Research*, 12(4):269-281, 1968.

An 18-year-old MR girl with excessive tyrosine concentrations in blood and urine, but without the classical kidney and liver disorders usually associated with tyrosinosis, is discussed. Pregnancy and birth histories were normal and no difficulties were encountered in the neonatal stage until age 6 months when convulsions occurred. After increasingly uncontrolled and aggressive behavior including self-mutilation, the girl was institutionalized. At 15 years of age, bilateral cataracts began to develop. One brother of the propositus is also MR and a sister died in infancy of unknown causes. Chromatography established the presence of excessive tyrosine and *p*-hydroxyphenyl compounds in the urine, while all other amino acid excretions were normal, nor did the S have the generalized aminoaciduria usually seen in tyrosinosis. It is concluded that excessive tyrosine metabolites do not necessarily have a deleterious effect on normal kidneys and liver; however, they may be harmful for the developing CNS, especially if the condition persists for more than 2 or 3 months. If so, dietary measures should be instituted early in cases of tyrosinemia. Since some Ss with tyrosinemia are mentally normal, the enzyme deficiency which is the basic defect in this disorder may be a secondary feature, and other factors may be responsible for both the enzyme defect and the MR which occurs. (30 refs.) - *K. Drossman.*

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University of Utrecht, Wilhelmina
Utrecht, The Netherlands

227 ARONSSON, SIDNEY, ENGLESON, GUNNAR, JAGENBURG, RUDOLF, & PALMGREN, BERTIL. Long-term dietary treatment of tyrosinosis. *Journal of Pediatrics*, 72(5):620-627, 1968.

The clinical and biochemical effects of a diet low in tyrosine and phenylalanine on a boy with early signs of tyrosinosis are reported. The patient showed elevated serum alkaline phosphatase activity, transient steatorrhea, generalized aminoaciduria, cirrhosis of the liver, hepatomegaly, rickets, glucosuria, and abnormal urinary excretion of *p*-hydroxyphenylpyruvic acid, *p*-hydroxyphenylacetic acid, and *p*-hydroxyphenyllactic acid. At 22 months, the patient began dietary treatment, receiving 100 mg tyrosine and phenylalanine/kg/day, with protein supplied as casein hydrolysate. During dietary therapy, the tubular reabsorption of the phosphate, glucose, and amino acids increased and the rickets healed. The liver decreased in size and its functions normalized. All these improvements were reversible upon increased intake of tyrosine and phenylalanine. (27 refs.) - *M.G. Conant.*

Department of Pediatrics
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Lund, Sweden

228 FAIRNEY, ANGELA, FRANCIS, DOROTHY, ERSSER, R.S., SEAKINS, J.W.T., & COTTOM, DENNIS. Diagnosis and treatment of tyrosinosis. *Archives of Disease in Childhood*, 43(231):540-547, 1968.

Dietary treatment of tyrosinosis first diagnosed in an infant at age 10 months, resulted in an increase in height, weight, motor development, and overall well-being by age 2 years. The child was found to have an abnormality of tyrosine metabolism, with renal tubular acidosis, hypophosphatemic rickets, and hepatocellular dysfunction. Clinical improvement and a return of the urinary amino acid pattern was noted on a low-protein diet which restricted tyrosine and phenylalanine. Dietary treatment should be routine in future cases of tyrosinosis, and a plasma tyrosine greater than 4 mg/100 ml, and methionine greater than 2 mg/100 ml with abnormal urinary p-hydroxylactic, -acetic, and -pyruvic acids is suspected. Natural protein intake can be adjusted according to serum tyrosine and phenylalanine levels. (21 refs.) - *L.E. Clark.*

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London W.C.1, England

229 TADA, KEIYA, WADA, YOSHIRO, YAZAKI, NATSUME, YOKOYAMA, YOSHIMASA, NAKAGAWA, HIROSHI, YOSHIDA, TOSHIO, SATO, TETSURO, & *ARAKAWA, TSUNEO. Dietary treatment of infantile tyrosinemia. *Tohoku Journal of Experimental Medicine*, 95(3):337-344, 1968.

An infant boy admitted to the hospital because of developmental retardation, hepatosplenomegaly, jaundice, a marked elevation of serum tyrosine, and a slight elevation of serum methionine was determined to have tyrosinemia. The patient was started on a low-tyrosine and low-phenylalanine diet at the age of 5 months; clinical symptoms began to subside but no weight gain was obtained. In the sixth week of treatment, a severe upper respiratory infection and pneumonia occurred and was considered to be due to an over restriction of diet, consequently, dietary tyrosine and phenylalanine were increased to 30 mg/kg and 35 mg/kg, respectively, and the infant showed an immediate positive response. After 10 months of treatment, this patient has continued to demonstrate clinical improvement with a reversal of hepatic and renal damage; his physical size is now within normal limits although his mental development still appears somewhat retarded. (10 refs.) - *K. Drossman.*

*Department of Pediatrics
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230 GREER, MELVIN, & WILLIAMS, CLYDE M. Diagnosis of branched-chain ketonuria (maple syrup urine disease) by gas chromatography. *Biochemical Medicine*, 1(1):87-91, 1967.

Quantitative determinations of α-ketoisocaproic, α-keto-β-methylvaleric, α-ketoisovaleric, α-hydroxyisovaleric, α-hydroxyisocaproic, and α-hydroxy-β-methylvaleric acids, the diagnostically significant acids in branched-chain ketonuria, can be made by extraction from a salt-saturated acidic urine sample, conversion of the acids to the methyl esters with ethereal diazomethane for 15 minutes, and analysis by gas chromatography using methyl benzoate as an internal standard. The analysis can be carried out in 2 hours by using columns packed with QF-1, XE-60, EGA, and/or SE-30. (11 refs.) - *M. G. Conant.*

Department of Medicine
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231 SCHNEIDERMAN, L.J. Latent cystathionuria. *Journal of Medical Genetics*, 4(4):260-263, 1967.

Methionine dietary supplementation caused marked urinary cystathionine excretion in 2 MR brothers with normal urines on ordinary diets. Cystathionine was detectable only on 2-dimensional chromatography on the methionine diet but on an ordinary diet was detectable only on 1-dimensional chromatography. Cystathionine was also detectable by 2-dimensional chromatography in the propositi's mother and brother, in 3 of 50 other MR patients, and in 1 of 50 healthy volunteers. In addition, a brother of an institutionalized patient and of the healthy volunteer also gave a positive test. In these Ss, a positive test was also found by dimensional chromatography. The clustering of cystathionine excretors in relatives of described patients would appear to indicate an hereditary basis for the

phenomenon; however, the genetic factors involved are still largely unknown and genetic polymorphism may exist. (8 refs.) - *E. Gaer.*

Department of Medicine
Stanford University School of Medicine
Palo Alto, California 94304

232 CARSON, NINA A.J., SCALLY, B.G., NEILL, D.W., & CARRE, I.J. Saccharopinuria: A new inborn error of lysine metabolism. *Nature*, 218(5142):679, 1968. (Letter)

A 22-year-old girl (IQ 67) discovered during routine screening of MR persons for amino acid disorders was found to have large quantities of lysine, citrulline, histidine, and saccharopine in her urine. A discussion of the possible pathways leading to this particular aminoaciduria is presented. Lysine is probably converted to glutaric acid through a pathway which utilizes saccharopine in this patient. The excessive amount of urinary citrulline is also striking and the connection between lysine and citrulline metabolism in this disorder needs further elucidation. (10 refs.) - *M.Drossman.*

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Grosvenor Road
Belfast, North Ireland

233 ROGERS, LON E., WARFORD, LLOYD R., PATTERSON, RICHARD B., & *PORTER, F. STANLEY. Hereditary orotic aciduria. I. A new case with family studies. *Pediatrics*, 42(3):415-422, 1968.

Hereditary orotic aciduria was diagnosed in an infant hospitalized because of growth retardation, megaloblastic anemia, and orotic acid crystalluria. Orotic aciduria is caused by a deficiency of orotidylic pyrophosphorylase and orotidylic decarboxylase which are essential enzymes in pyrimidine formation. Treatment with oral uridine (1.5 gm/day) produced a rapid increase in the patient's weight and caused a rapid remission of the anemia. Assays of erythrocyte enzymes were performed on 23 blood relatives in 4 generations, and in 5 in-laws of the propositus and orotic acid enzyme deficiencies were found in 9 blood relations and in 1 in-law. These family members were assumed to be heterozygous. The enzyme deficiencies in this disorder are found in most tissues and were also noted in this S's liver as well as his erythrocytes. This is only the fourth described case of orotic aciduria reported in the literature. (15 refs.) - *K.Drossman.*

*Department of Pediatrics
Duke University Medical Center
Durham, North Carolina 27706

234 ROGERS, LON E., & PORTER, F. STANLEY. Hereditary orotic aciduria. II. A urinary screening test. *Pediatrics*, 42(3):423-428, 1968.

A colorimetric urinary test for orotic aciduria which shows promise as a rapid, accurate, easily administered, large-scale screening device is described. The assay is based on the fact that 5,5'-dibromobarbituric acid is formed when orotic acid reacts with bromine water. This compound can be converted into barbituric acid by ascorbic acid, and barbituric acid and Ehrlich's Reagent form a yellow color with a maximum optical density at 480 mμ. Although non-orotic acid substances in the urine cause enough interference to prevent quantitation, the test can detect both homozygous and heterozygous Ss with hereditary orotic aciduria. (9 refs.) - *K. Drossman.*

Department of Pediatrics
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235 Carnosinaemia. *Lancet*, 1(7547):851-852, 1968. (Editorial)

Carnosinemia is another inborn error of metabolism associated with neurological disease and mental defect. Carnosine and anserine are imidazole dipeptides which are hydrolyzed to their constituent amino acids by carnosinase. They are normally not present in blood and only in trace quantities in urine. Greatly increased quantities are found when large amounts of meat or fowl are consumed. Two unrelated children with progressive neurological symptoms and MR were determined to have carnosinemia and carnosinuria. Carnosinuria persisted in these 2 patients when exogenous sources were excluded. When fed large quantities of anserine, these children excreted anserine and carnosine but not their hydrolyzed products, 1-methyl-histidine and β-alanine. This suggests a lack of carnosinase. Enzyme studies on muscle biopsy specimens are needed. (18 refs.) - *J. Snodgrass.*

236 HOLLERMAN, CHARLES E., & CALCAGNO, PHILIP L. Aminoaciduria-renal transport. *American Journal of Diseases of Children*, 115(2):169-178, 1968.

Renal amino acid transport is dependent upon a number of biochemical factors, particularly transport systems which are specific for the type of amino acid involved. Increased aminoaciduria can be due to elevated serum amino acid from an inherited enzyme defect or from hepatic disease or injury. Aminoaciduria can also be due to defective renal tubular transport of a single or a group of amino acids, renal damage, or excretion of amino acids resulting from intermediate cellular metabolism. Factors which influence the transport systems are sodium, pyridoxine, adenosine triphosphate, and possibly the lipid phase of the cell membrane. Currently, 4 transport systems appear to be identical in both kidney and intestine. The first is specific for neutral amino acids and changes in the molecule of any member of this group will affect the excretion of the amino acid involved. Hartnup's disease is an example of a disturbance of this transport system. The second system is specific for the dibasic amino acids. A clinical correlate of this disturbance is cystinuria. Another transport system is specific for the acidic amino acids; however, no clinical manifestation has been found for this deficiency. The final transport system is specific for the imino acids and glycine. Experimental studies have indicated that there may be 3 different systems for this group since these acids are affected differently when

conditions of transport are varied. Familial hyperprolinemia and Joseph's disease are clinical examples of disturbance of this transport system. A fifth system, present only in the kidney, is concerned with β amino acids. Apart from these, nonspecific aminoaciduria can be the result of any disease which secondarily affects the transport system. Finally, amino acids will affect the reabsorption of phosphate while at other times aminoaciduria will involve products of intermediate metabolism. (86 refs.) - *E. Gaer.*

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Washington, D.C. 20007

237 CAIN, A.R.R., & HOLTON, J.B. Histidinaemia: A child and his family. *Archives of Disease in Childhood*, 43(227):62-68, 1968.

Histidinemia, an inherited disorder of histidine metabolism characterized by the absence of skin histidase which converts histidine to urocanic acid, was diagnosed in an 18-month-old boy with a history of convulsions. Although in previous studies histidinemia has often been associated with gross MR and congenital malformations, the present S showed only slight retardation in intellectual and visual-motor development. It is expected that he will eventually function as a child of below average IQ, but within normal limits for schooling. He had a rough IQ on the Terman-Merrill Intelligence Scale of 86. Familial studies confirmed that histidinemia is inherited as an autosomal recessive. (24 refs.) - *K. Drossman.*

Southmead Hospital
Bristol, England

238 LONSDALE, DERRICK. Hyperalaninemia with pyruvicemia. *New England Journal of Medicine*, 278(22):1235, 1968. (Letter)

A 6-year-old boy who had recurrent episodes of 5- to 10-day attacks of cerebellar ataxia which followed incidents of infection, vaccination, or head injury was studied longitudinally. Characteristics of the attacks include: an elevation of alanine concentration; an increase in pyruvic acid concentration; the presence of acetonuria; a macroglobulin in the serum; and the presence of an abnormal molecule (containing a polypeptide) in the urine. The S also had optic atrophy at each examination. (No refs.) - *J. P. West.*

Department of Pediatrics
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Cleveland, Ohio

239 PINSKY, L., CALLAHAN, J.W., & WOLFE, L.S. Fucosidosis? *Lancet*, 2(7577):1080, 1968. (Letter)

A preliminary report is given on a 3-year-old girl with type II monosialogangliosidosis in which the GM_1 ganglioside accumulates only in the brain (as contrasted with type I monosialogangliosidosis in which the ganglioside accumulates in liver, spleen, and brain). It is differentiated from pseudo-Hurler's syndrome because the GM_1 ganglioside accumulates only in the brain; however, the β-galactosidase in fibroblasts from the S have less than 1/10 the normal activity in cells (a feature of pseudo-Hurler's syndrome). The S lacks the clinical features of a lipomucopolysaccharidosis, but there are abnormalities of the acid mucopolysaccharides in the urine and in the fibroblast culture medium. Further details on this disorder are to be reported later. (3 refs.) - *K. Drossman.*

Jewish General Hospital
Montreal, Canada

240 DONNELL, G.N., BERGREN, W.R., & NG, W.G. Galactosemia. *Biochemical Medicine*, 1(1):29-53, 1967.

Galactosemia is an inborn error of metabolism in which there is usually a deficiency of galactose-1-phosphate uridyl transferase; however, another enzyme deficiency recently described—that of galactokinase—is also associated with galactosemia. Studies in galactose metabolism are conducted in diagnosis, treatment, genetics, biochemistry, and age effects. Affected children appear normal neonatally; however, when milk is added to their diet, the infants will show symptoms of jaundice, hepatomegaly, cataracts, MR, susceptibility to infection, and a general failure to thrive. In mild cases, the diagnosis may not be made for weeks, and untreated children usually manifest MR either moderately or severely. Exclusion of dietary galactose prevents and reverses most clinical symptoms. Because of familial occurrence, sibling involvement, and parental normality, an autosomal recessive inheritance is suggested for this disorder. The question of age effects needs further elucidation; there does not appear to be an increase in galactose tolerance with age although some studies have shown an increased excretion of galactose with age which may be the result of utilization of alternate metabolic pathways. (49 refs.) - *K. Drossman.*

School of Medicine
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241 GRIFFITHS, A.D. Association of hypoglycaemia with symptoms in the newborn. *Archives of Disease in Childhood*, 43(232):688-694, 1968.

The relationship among hypoglycemia, symptoms (apnoeic attacks, alterations in muscle tone, convulsions, and irritability), and death in 1,000 infants admitted to a special care nursery was studied. The incidence of hypoglycemia (blood glucose level below 20 mg/100 ml) was 17 in 1,000 live births. Symptoms were shown in 60.1% of the infants with hypoglycemia, compared with 52.9% in infants without hypoglycemia. There was no significant difference in the incidence of symptoms in infants with and without hypoglycemia when they are subdivided according to predisposing factors (anoxia, diabetic mother, prematurity, respiratory distress syndrome, and low birth-weight for gestational age) and the death rates were identical. In the hypoglycemic infants who died, an acceptable cause of death other than hypoglycemia was established with 1 exception, suggesting that the association of

hypoglycemia and symptoms may be fortuitous. (22 refs.) - *M.G. Conant.*

Department of Child Health
Welsh National School of Medicine
Cardiff, Wales

242 INGRAM, T.T.S., STARK, G.D., & BLACKBURN, IVY. Ataxia and other neurologicl disorders as sequels of severe hypoglycemia in childhood. *Brain*, 90(4):851-862, 1967.

Of 26 Ss who had had hypoglycemic coma or convulsions between the ages of 10 weeks and 2 years, 10 were found to have ataxia or ataxic diplegia at follow-up. The Ss were given a physical examination, psychometric assessment, and EEG. Diabetes was associated with hypoglycemia in 12 Ss. Of these, 6 were normal and 4 had significant neurological abnormalities of which ataxia was a feature. Spontaneous hypoglycemia of unknown etiology was found in 13 Ss. While 3 of these were normal, 9 had significant neurological abnormalities, and 6 of the 9 had ataxic syndromes. From the follow-up data, it would appear that intellectual and neurological damage was more severe in the group which suffered from spontaneous hypoglycemia than in those who had diabetes. This could result from greater difficulty in diagnosing the cause in the former whereas in diabetes, hypoglycemia is more readily suspected. The age of the S when the hypoglycemia occurred would be a factor in the severity of the sequelae. Children with spontaneous hypoglycemia may have pre-existing brain abnormalities which alter carbohydrate metabolism and result in coma or seizures; a high percentage of these patients had an abnormal prenatal or perinatal period. Brain damage, particularly to the cerebellum, is most likely to occur following subsequent attack rather than the initial one. Identification bands or badges on susceptible children would lead to faster diagnosis and treatment with a concomitant decrease in the incidence of permanent neurological damage. (28 refs.) - *E. Gaer.*

Department of Child Life and Health
University of Edinburgh
Edinburgh, Scotland

243 FERNANDES, J., & HUIJING, F. Branching enzyme-deficiency glycogenosis: Studies in therapy. *Archives of Disease in Childhood*, 43(229):347-352, 1968.

This is the fifth reported case of glycogen storage disease type IV which is characterized by the accumulation of an amylopectin-like glycogen and is caused by a deficiency of a branching enzyme (α-1,4-glucan: α-1,4-glucan 6-glucosyltransferase). At 5 months, the patient (male) had an enlarged firm liver, no evidence of MR, poor muscle tone, and depressed tendon reflexes. Following progressive cirrhosis of the liver with wasting, ascites, splenomegaly, and intestinal hemorrhages, the patient died at 11 months of a respiratory infection. Abnormal glycogen and enzyme deficiency were observed in leukocytes, but blood sugar concentrations, glucose, galactose, and fructose tolerance tests, and a glucagon test revealed no other disturbances in the carbohydrate metabolism. Intravenous administration of purified fungal α-glucosidase (2 g/day for 4 days and 3 g/day for 2 days) when the patient was 10 months old resulted in a decrease in the glycogen content of the liver from 10.7% to 1% to 2%, and no unfavorable reactions were observed. Intramuscular administration of zinc glucagon had dubious results since the patient was in a poor condition and diet therapy (high protein, low carbohydrate diet) had no effect on the cirrhotic process. (20 refs.) - *M.G. Conant.*

Wilhelmina Kinderziekenhuis
University of Utrecht
Nieuwe Gracht 137, Utrecht, The Netherlands

244 HOMMES, F.A., POLMAN, H.A., & REERINK, J.D. Leigh's encephalomyelopathy: An inborn error of gluconeogenesis. *Archives of Disease in Childhood*, 43(230):423-426, 1968.

A 1-year-old boy admitted to the hospital with anorexia, failure to thrive, irritability, and MR was determined to have Leigh's encephalomyelopathy. The patient had 6 siblings, 3 of whom had died with the same symptoms and with progressive MR, starting from 3 to 6 months of age. Clinical findings included high blood lactate and pyruvate and low fasting blood glucose levels; a lack of pyruvate carboxylase activity, and normal phosphoenolpyruvate carboxykinase. Lipoic acid was started as treatment and the child's condition improved both physically and mentally. The mechanism responsible for the brain damage in this syndrome is not fully understood. (14 refs.) - *K. Drossman.*

Department of Pediatrics
State University at Groningen
Groningen, The Netherlands

245 TAMURA, TSUNENOBU. Urinary excretion of formiminoglutamic acid in children with riboflavin deficiency. *Tohoku Journal of Experimental Medicine*, 95(2):115-119, 1968.

Children with riboflavin deficiency showed reduced urinary formiminoglutamic acid (FIGLU) levels after an oral dose of histidine regardless of their serum *Lactobacillus casei* folate levels. Serum folate activity, blood riboflavin, and FIGLU level in 3-hour urine from 62 boys (CA 8-10 yrs) following an oral dose of histidine monohydrochloride were determined, taking 9.0 μg/100 ml as the lower limit of normal blood riboflavin value and 6.0 mμg/ml as the lower limit of serum *L. casei* folate level. The increased supply of tetrahydrofolate available for the formiminotransferase reaction may arise from decreased $N^{5,10}$ methylenetetrahydrofolate reductase activity caused by the riboflavin deficiency. (21 refs.) - *M.G. Conant.*

Department of Pediatrics
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Sendai, Japan

246 POMEROY, JOANNE, EFRON, MARY L., DAYMAN, JACQUELINE, & *HOEFNAGEL, DICK. Hartnup disorder in a New England family. *New England Journal of Medicine*, 278(22):1214-1216, 1968.

A family of 3 siblings with cerebellar ataxia, photosensitive rash, MR, renal aminoaciduria, and excessive urinary indoles is described and the disease is classified as Hartnup's disorder. A defect in amino acid transport into the small intestine and the proximal renal tubules due to an autosomal recessive gene appears to be the basic cause of this syndrome. Two of the affected siblings produced normal, healthy offspring. There is some evidence of an increased sensitivity to sunlight in heterozygotes and increased urinary indoles which may be useful in genetic counseling of affected families. (6 refs.) - *K. Drossman.*

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247 ATTAL, C. La maladie de Refsum (Refsum's disease). *Medecine Infantile*, 74(2):151-154, 1968.

Refsum's disease, which involves excess phytanic acid in the liver and kidneys, is discussed with respect to clinical aspects, anatomical pathology, and biochemistry. Whether the nearly completely blocked degradation of phytanic acid is due to the presence of an abnormal enzyme or an insufficient amount of a normal enzyme is not known. This disease involves peripheral nerve lesions with almost complete disappearance of myelin. (15 refs.) - *M. G. Conant.*

248 ATTAL, C. Les deficits en lipoproteines (Lipoprotein deficiencies). *Medecine Infantile*, 74(2):157-160, 1968.

Tangier's disease and abetalipoproteinemia, characterized by the absence of α- and β-lipoproteins, respectively, are discussed. The former involves lowered cholesterol and phospholipid levels, has no neurological effects, and is transmitted by a recessive autosome mode. Abetalipoproteinemia produces early neurological disturbances (ataxia, nystagmus) in children and later retinopathy, and also involves acanthocytosis, steatorrhea, and macular atrophy. (18 refs.) - *M.G. Conant.*

249 MARKS, MELVIN I., & *MARKUS, ARTHUR J. Wolman's disease. *Canadian Medical Association Journal*, 99(5):232-235, 1968.

An infant girl admitted to the hospital with persistent diarrhea and vomiting, hepatosplenomegaly, and enlarged and calcified adrenal glands was determined to have Wolman's disease, a disorder of lipid metabolism. The infant died at 3 1/2 months of age. At autopsy, diffuse calcification of both adrenals was confirmed, the liver showed fibrosis, and cell analysis demonstrated a high level of cholesterol esters in the liver, adrenals, skin, and small intestine. Death invariably occurs before 4 months of age in this disorder; in all cases the basic error appears to be in the metabolism of cholesterol with an over-deposition of cholesterol in most tissues. A feature of special interest is the demonstration of lymphocyte vacuolization in both carriers and patients with this disorder; a finding of particular significance in genetic counseling of afflicted families. (12 refs.) - *K. Drossman.*

*Montreal Children's Hospital
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250 ATTAL, C. Les gangliosidoses: Idioties amaurotiques familiales (Gangliosidoses: Amaurotic familial idiocies). *Medecine Infantile*, 74(2):95-105, 1968.

Tay-Sachs disease (infantile amaurotic idiocy) is discussed in detail with respect to the clinical aspects, anatomical pathology, genetics, enzymology, and other amaurotic familial idiocies. GM_1 gangliosidosis, and GM_3 gangliosidosis also are discussed briefly in terms of symptoms and biochemistry. Tay-Sachs disease, which generally appears at 6-12 months of age, involves arrested mental development, progressive muscular weakness, and optical atrophy. Abnormal accumulation of the ganglioside GM_2 is involved and the disease is transmitted as an autosomal recessive. Other amaurotic idiocies (late infantile, juvenile, young adult, and congenital) are also due to various metabolic disorders. GM_1 gangliosidosis and GM_3 gangliosidosis, both familial disorders, involve retarded or regressive development and are associated with abnormal accumulations of the gangliosides GM_1 and GM_3, respectively, in cells of the central nervous system. (26 refs.) - *M.G. Conant.*

251 PERONA, G. P., BACCICHETTI, C., & TENCONI, R. Acid phosphatase in spleen tissue-culture in Gaucher's disease. *Lancet*, 2(7563):358-359, 1968. (Letter)

Tissue from the spleen of a 5-year-old female with Gaucher's disease was cultured (along with spleen tissue from Ss with Cooley's anemia, hereditary spherocytosis, and traumatic rupture of the spleen) to show "spillage" of acid phosphatase from tissue cells. Tests were made every 5-8 days over a period of 22 days. Acid phosphatase levels at the end of 22 days showed 88.5 in the Gaucher's disease spleen culture-medium and 4.5±0.7 in control cultures. The ratio of cells to medium was less than 1/1000. (3 refs.) - *E.F. MacGregor.*

Paediatric Clinic
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Padua, Italy

252 HAM-HUU-TRUNG, & PUISSAN, C. Maladie de Gaucher de l'enfant (Gaucher disease in children). *Medecine Infantile*, 74(2):135-140, 1968.

Infantile Gaucher disease, a genetic disorder characterized by the absence of an enzyme for degrading glucocerebroside which then accumulates in

the reticulohistiocytic cells, is discussed in terms of clinical aspects, anatomical lesions, biochemistry, diagnosis, pathogeny, genetics, and treatment. Hepatosplenomegaly occurs and neurological disturbances (strabismus, hypertonia, dysphagia, apathy, and MR) appear rapidly. The disease is diagnosed cytologically (Gaucher cells), biochemically (excess glucocerebroside), and enzymatically (acid phosphatase and glucocerebrosidase). (15 refs.) - *M.G. Conant.*

253 PHAM-HUU-TRUNG, & PIUSSAN, C. La maladie de Nieman-Pick de l'enfant (Infantile Nieman-Pick disease). *Medecine Infantile*, 74(2):145-149, 1968.

Infantile Nieman-Pick disease is discussed in terms of clinical aspects, diagnosis, biochemistry, enzymology, pathogeny, genetics, and treatment. A deficiency of sphingomyelinase, increased concentrations of sphingomyelin and cholesterol, hepatosplenomegaly, and neurological disturbances (mental degradation, poor muscle tone) are observed. The disease appears at 3 to 6 months of age, is fatal before 1 year of age, and is transmitted as an autosomal recessive. (19 refs.) - *M.G. Conant.*

254 ATTAL, C. Les sphingolipidoses (Sphingolipidoses). *Medecine Infantile*, 74(2):91-92, 1968.

Glycosphingolipidoses and sphingomyelinoses, the 2 main groups of sphingolipidoses, are discussed with respect to chemical substance in excess and metabolic disorder produced. In Niemann-Pick disease, the sphingomyelin ceramidephosphoryl choline is accumulated in the central nervous system. For the glycosphingolipidoses, accumulation of ceramide, hexoses, and sialic acids is involved in amaurotic familial idiocies, accumulation of ceramide-galactose-3-sulfate in metachromatic leukodystrophy, accumulation of ceramide glucose in Gaucher's disease, and accumulation of ceramide- glucose-galactose-galactose in Fabry's disease. The pathogeny of these disorders is not fully understood, even in the cases where enzyme deficiency is known to exist. (No refs.) - *M.G. Conant.*

255 CARTER, CHARLES H., WAN, ABRAHAM T., & CARPENTER, DONALD G. Commonly used tests in the detection of Hurler's syndrome. *Journal of Pediatrics*, 73(2):217-221, 1968.

Urine specimens from 800 non-Hurler MR institutionalized patients and from 54 patients with Hurler's syndrome were analyzed by the toluidine blue spot test, an acid-albumin turbidimetric test, a modified gross albumin turbidity test, and the Dische carbazole test. The carbazole test is most efficient (96.2% positive rate for Hurler syndrome patients), but not suitable for mass screening. The gross turbidity test is recommended for use in screening as it is simple and rapid and gives a 90.7% positive rate for Hurler syndrome patients. Three Hurler patients were tested periodically for 1.5-2 years and 2 showed a high incidence of normal results on all but the carbazole test. (13 refs.) - *M.G. Conant.*

Sunland Hospital
Orlando
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256 BOISSE, J. Le syndrome de Hurler-Hunter (The Hurler-Hunter syndrome). *Medecine Infantile*, 74(2):107-119, 1968.

The Hurler-Hunter syndrome is discussed with respect to different varieties (recessive autosome form, sex-linked form, predominantly neurological form, and adult form), differential diagnosis, genetics, pathogeny, and treatment. The disorders involve accumulation and urinary excretion of mucopolysaccharides, dysmorphy, MR (except the adult form), and corneal opacities (except the sex-linked form). Hurler pseudopolydystrophy and familial visceral neurolipidosis resemble classical Hurler disease without abnormal mucopolysaccharides, and mucopolysaccharides are not accumulated in the tissues in Maroteaux-Lamy polydystrophic dwarfism and in Morquio disease. (16 refs.) - *M. G. Conant.*

257 CONSTANTOPOULOS, G. Hunter-Hurler syndrome: Gel filtration and dialysis of urinary acid mucopolysaccharides. *Nature*, 220(5167):583-585, 1968. (Letter)

Acid mucopolysaccharides (AMPS) were isolated from the non-dialyzed urine of patients with Hurler-Hunter syndrome and of normal controls and subjected to gel filtration on Sephadex G-200. Different elution patterns were shown by patients who excrete predominantly heparitin sulfate, patients who excrete a mixture of heparitin sulfate and chondroitin sulfate, and normal controls. The urinary AMPS (heparitin sulfate and chondroitin sulfate) from the patients have considerably lower molecular weights than those from the controls. This finding was substantiated by dialysis studies where up to 50% of the urinary AMPS isolated from the patients was lost during 3 successive dialyses. (7 refs.) - *M.G. Conant.*

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258 MAROTEAUX, PIERRE. Les mucopolysaccharidoses (Mucopolysaccharidoses). *Medecine Infantile*, 74(10):759-797, 1967.

Six mucopolysaccharidoses and a related disease, Hurler pseudopolydystrophy, are discussed in terms of clinical aspects, radiology, hematology, genetics, biochemistry, and treatment. Hurler's disease, which is usually noticed around the second year, involves abnormally high urinary chondroitin sulfate B and heparitin sulfate levels and the presence of Gasser cells in the blood and Buhot cells in the bone marrow. The disease is associated with corneal opacities, cartilage growth disturbances, and MR and is transmitted as an autosomal recessive. A similar, sex-linked form exists. Related mucopolysaccharidoses are late Hurler disease, polydystrophic oligophrenia, polydystrophic dwarfism, and mucopolysaccharidosis associated with a sulfatidosis. MR occurs in all except late Hurler disorder and all are transmitted as autosomal recessives. Excess urinary chondroitin sulfate B is found in all except polydystrophic oligophrenia and excess urinary heparitin sulfate in all except polydystrophic

dwarfism. Hurler pseudopolydystrophy involves no excess urinary mucopolysaccharide, but otherwise resembles Hurler's disease. Morquio's disease, which involves excess urinary keratosulfate with no MR is also discussed. (73 refs.) - *M.G. Conant.*

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259 CAVALLINO, ROBERT, & *GROSSMAN, HERMAN. Wilson's disease presenting with rickets. *Radiology*, 90(3):493-494, 1968.

Wilson's disease must be differentially diagnosed from vitamin D-resistant rickets, as illustrated by a case history of a 12-year-old boy with rachitic changes at the age of 8 years. The rickets were treated with vitamin D; 3 years later a corneal examination revealed Kayser-Fleischer rings typical in Wilson's disease and a liver biopsy showed enlarged hepatic cell nuclei filled with glycogen. Serum ceruloplasmin and copper were low, and the S had tongue tremors, hyperreflexia, and mild terminal tremor. Similar symptoms were found in the patient's sister and other family members. Early diagnosis and treatment of Wilson's disease, which can be confused with vitamin D-resistant rickets or Fanconi's syndrome, can prevent morbidity and fatality. (No refs.) - *M.T. Lender.*

*The New York Hospital
Cornell Medical Center
New York, New York 10021

260 RIVLIN, RICHARD S., MENENDEZ, CARLOS, & LANGDON, ROBERT G. Biochemical similarities between hypothyroidism and riboflavin deficiency. *Endocrinology*, 83(3): 461-469, 1968.

The enzyme activities of glycolic acid oxidase and TPN-cytochrome c reductase and hepatic concentrations of flavin mononucleotide and flavin adenine dinucleotide are reduced in rats made hypothyroid and even more reduced in rats made riboflavin deficient, compared to normal controls. The hepatic flavokinase level is depressed by 50% in both experimental groups. These changes are not related to conditions of food intake and are significantly improved by *in vivo* administration of thyroxine to hypothyroid rats and riboflavin to riboflavin deficient rats. In pair-fed controls, the hepatic activity of glycolic acid oxidase (half of that of rats fed *ad lib*) is 9 times that of riboflavin deficient rats. Reduced activity of flavoprotein enzymes in both groups may be related to the common factor of reduced synthesis from riboflavin. (23 refs.) - *M.G. Conant.*

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261 HAMILTON, WILLIAM. Surgical procedures in congenital adrenal hyperplasia. *Developmental Medicine and Child Neurology*, 19(1):105-107, 1968. (Annotation)

Congenital adrenal hyperplasia, resulting from a defect in the biosynthesis of cortisol, expresses itself in roles with cryptorchidism and hypospadias or with macrogenitosomia, and in females with varying degrees of virilism. Surgical correction of clitoral hypertrophy and fusion of the labio-scrotal folds is recommended before school age after the perineal structures are large enough for construction of a vaginal opening. Correction of male external genitalia is best done before school age, and should include release of any chordee and correction of the cryptorchidism, bifid scrotum and hypospadias. (18 refs.) - *J. Snodgrass.*

Department of Child Health
The University
Glasgow, W.2, Scotland

262 POITOUT, M., JOB, J. C. & ROSSIER, A. Nanismes de causes rares (Rare dwarfisms). *Medecine Infantile*, 75(7): 457-491, 1968.

Twenty rarely observed dwarfisms are discussed with respect to appearance, morphology, other clinical signs, radiology, biology, mental development, and etiology. MR always occurs in the De Lange syndrome, in the amstelodamensis type, low birth-weight twin dwarfism, leprechaunism, Camus nose dwarfism, Prader-Labhardt-Willi syndrome, intrauterine growth retardation caused by embryopathic viruses, and male Turner syndrome. MR is observed frequently in Albright hereditary osteodystrophies, Conradi's disease, Hallermann-Streiff syndrome, idiopathic intrauterine growth retardation, Rothmund-Thomson syndrome, and the Seckel syndrome. (57 refs.) - *M.G. Conant.*

Hopital Saint-Vincent-de-Paul
Paris, France

263 GOLDSTEIN, RAPHAEL. Congenital lipomatosis of the pancreas: Malabsorption, dwarfism, leukopenia with relative granulocytopenia and thrombocytopenia. *Clinical Pediatrics*, 7(7):419-422, 1968.

Although a clinical syndrome of congenital lipomatosis of the exocrine pancreas has been described approximately 30 times in the world literature, the anatomical, physiological, and embryological correlates have yet to be determined. Pathological findings limited to pancreatic acinar replacement by fat cells account for a decrease in pancreatic enzymes and subsequent malabsorption syndrome, failure to thrive, and retardation of growth, but do not explain the hematological picture of moderate anemia with granulocytopenia, relative lymphocytosis, and thrombocytopenia despite an apparently normal bone marrow. This moderate leukopenia does not explain the almost continual infections of multiple organ systems

(normal immunoglobulins) which are frequently fulminating and fatal. Pancreatic exocrine tissue and bone marrow both develop during the fifth month of intrauterine development but a specific insult at that time has not been identified. (12 refs.) - *E.L. Rowan.*

8290 Main Street
Buffalo
New York 14221

264 WARKANY, JOSEF, & TAKACS, EVA. Changes of endocrine gland produced by teratogenic methods: The pituitary gland. *Archives of Pathology*, 85(1):101-113, 1968.

Endocrine anomalies associated with anencephaly were investigated by the use of teratogenic substances on pregnant rats. Pituitary anomalies were associated with exencephaly, the forerunner of anencephaly, in which the brain is everted due to a failure of the neural tube to close; this leaves the brain unprotected by mesoderm and ectoderm, and in human fetuses, the exposed portions of the brain are destroyed during the long intrauterine growth. The anterior pituitary lobe is usually well-preserved in experimental rats but may not be in the normal position and may have abnormal connections with the brain and posterior lobe. Adrenal glands in these animals are more or less normal; in those fetuses without pituitaries, the adrenals were present but were small and undifferentiated. Fetuses with hydrocephaly have normal pituitaries. Pituitary malformations are implicated in human embryology in such disorders as craniopharyngeal canal, teratoma, and cystic meningioma, as well as hydrocephaly. (33 refs.) - *K. Drossman.*

Children's Hospital
Cincinnati, Ohio 45229

265 KOCHHAR, D. M. Studies of vitamin A-induced teratogenesis: Effects on embryonic mesenchyme and epithelium, and on incorporation of H-thymidine. *Teratology*, 1(3): 299-310, 1968.

The teratogenic action of hypervitaminosis A was studied experimentally with rat embryos, and congenital malformations associated with the excess vitamin were noted. All treated embryos were growth retarded, had abnormal dorsal curvatures, protusion of the mesencephalon, decreased somite number, and cellular disorganization. Differences between control and treated embryos in the number of thymidine labeled cells were found in the liver, head mesenchyme, and posterior palantine shelves and the distribution of labeled cells in the dorsal skin of treated embryos was peculiar. Vitamin A has some physio-chemical properties, such as high surface activity and membrane permeability action which allow widespread effects from excessive or deficient amounts in embryonic nutrition. Hypervitaminosis A inhibits cell proliferation in cell cultures and mitosis interference has been observed in previous reports; however, the actual role of this vitamin in the production of such congenital malformations as cranioschisis, spina bifida, anencephaly, microphthalmia, and others, needs further elucidation. (24 refs.) - *K. Drossman*

University of Iowa
Iowa City, Iowa 52240

New growths

266 ROSMAN, N. PAUL, & PEARCE, JOHN. The brain in neurofibromatosis (von Recklinghausen's disease): A suggested neuropathological basis for the associated mental defect. *Brain*, (4):829-838, 1967.

A pathological study of the brains of 10 Ss with multiple neurofibromatosis revealed 5 to have extensive disorganization of the cerebral tissues associated with MR, and 5 to have less disorganization with normal intelligence. The 5 MR Ss had disordered cortical architecture with random neuronal orientation, disarrayed cortical lamination and hetertopic cortical neurones in the cortical molecular layer and subcortical white matter. Heterotopic neurones were also found in the deep cerebral white matter in 3 cases. Gross cerebral malformation was found in 1 case and glial nodules in another. In the normal intellect Ss, heterotopic subcortical neurones were found in the white matter in all 5 cases while 3 of the 5 had disordered cerebral cortical architecture. All 5 MR Ss had non-progressive mental deficiency suggesting that the disordered cortical architecture could be due to a failure of normal embryonic neuronal migration from the primitive matrix layer to the cortex. Since similar but less severe abnormalities of cortical architecture and gray matter heterotopias within the white matter have recently been found in the brain of patients with muscular dystrophy, it would seem possible that some unknown genetic factor may be responsible in both diseases for preventing embryonic neuronal migration which results in a form of cerebral dysgenesis. (26 refs.) - *E. Gaer.*

Departments of Neuropathology-Neurology
and Pathology
Harvard Medical School
Boston, Massachusetts 02115

267 JAECK, D. Signes et diagnostic des tumeurs cerebelleuses de l'enfant (Symptoms and diagnosis of cerebellar tumors in children). *La France Medicale*, 31(9):413-426, 1968.

Perfected neuroradiologic diagnostic techniques and surgical techniques, which permit an earlier and more precise diagnosis of cerebellar tumors (medulloblastoma, astrocytoma, and ependymoma) in children, have contributed to the longer survival times. Of the 3 types of tumor, only the medulloblastoma is malignant and, even with radiotherapy, only 10% of the cases survive 5 years. The benign tumors are amenable to surgical excision and showed longer survival times, especially for cystic astrocytomas. Iodoventriculography and fractional gas encephalography are useful techniques for diagnosing the cerebellar tumors and for distinguishing them from non-tumor neurologic conditions. (7 refs.) - *M.G. Conant.*

268 WEIR, BRYCE, & ELVIDGE, ARTHUR R. Oligodendrogliomas: An analysis of 63 cases. *Journal of Neurosurgery*, 29(5):500-505, 1968.

Sixty-three patients with oligodendrogliomas had seizures (the most common initial symptom), calcification in 56% of the tumors, and abnormal EEG patterns in 89% of 47 cases. All patients had at least 1 operative removal and 56% received some radiation therapy. Survival times with repeated therapy show a progressive decrease and the duration of preoperative symptoms is inversely related to that of postoperative survival. Of the 30 patients still alive, 66% have returned to work, and 7 have shown no progression or recurrence of symptoms for 6-22 years following treatment. Larger removals of tumors appear to result in longer survival. (42 refs.) - *M.G. Conant.*

University of Alberta Hospital
Edmonton, Alberta, Canada

Prenatal influence

269 LORBER, JOHN, & ZACHARY, R. B. Primary congenital hydrocephalus: Long-term results of controlled therapeutic trial. *Archives of Disease in Childhood*, 43(231): 516-527, 1968.

A longitudinal study of thirty consecutive cases of primary congenital hydrocephalus without spina bifida cystica was conducted in order to evaluate the value limitations, indication for, and timing of placement of the Holter valve. Infants received complete neurological and physical exams, including visual acuity and optic fundi. The degree of hydrocephalus was assessed by ventriculography and head circumference. Ss were re-examined at 6, 12, 18, 24 months of age and on subsequent birthdays. Developmental status, scholastic ability, school progress, and psychometric tests provided useful information. The tension of the fontanelle, palpation of the Holter valve, increase in head size, and optic fundi were considered when evaluating the function of a shunt and the need for revision. The therapeutic group had ventriculocaval shunts with Holter valves. The control group received no surgery with the exception of 2 cases. Nine of the 25 survivors in the therapeutic group are normal, while 4 others are normal but have large heads. Five deaths were counted, 3 or 4 due to complications of the operation. Substantial intellectual and neurological loss was associated with complications of the shunt in 8 Ss due to blockage and infection. Visual defects and upper motor neuron lesions were encountered in 13 Ss. Two girls were found to be precocious sexually. Aims for advancement in treatment should be: earlier referral for specialized treatment, proper timing of surgical procedures, and catching the shunt before it blocks and properly revising it. Most Ss with uncomplicated hydrocephalus, adequately treated, should survive a number of years and remain normal. (8 refs.) - *L.E. Clark.*

Department of Child Health
University of Sheffield
and Children's Hospital
Sheffield, England

270 HAYDEN, PATRICIA W., FOLTZ, ELDON L., & SHURTLEFF, DAVID B. Effect of an oral osmotic agent on ventricular fluid pressure of hydrocephalic children. *Pediatrics*, 41(5):955-967, 1968.

The effect of oral isosorbide on ventricular fluid pressure in 14 hydrocephalic children was studied by using continuous direct pressure recording with a closed isometric system. Direct venous pressure was measured by using a scalp vein needle and recorded as were venous pressure, cardiac rate, and respiratory rate. A baseline pressure pattern was thus established for each patient in 48-72 hours. A single oral dose of isosorbide (1-3 g/kg) produced significant reductions (average 50%) in ventricular fluid pressure in 13 of the 14 patients with no toxic side effects. Multiple doses of isosorbide produced rebound pressure greater than the baseline in 5 out of 10 patients and after 72 hours of continuous drug administration, significant dehydration and hypernatremia were observed. Intravenous administration of urea or mannitol produced a rapid pressure drop followed by a return to or surpassing of the baseline pressure, while oral acetazolamide caused an initial pressure rise followed by a transient decrease to or slightly below the baseline. Long-term use of isosorbide does not seem feasible; however, the drug may be valuable in counteracting hypertension related to an obstructed ventricular-cardiac shunt. (37 refs.) - *M.G. Conant.*

University of Washington
Seattle, Washington 98105

271 BIENIARZ, J., GULIN, L., ARNT, I. C., HASHIMOTO, T., SAGUIER, V., & CALDEYRO-BARCIA, R. Aortoiliac compression by uterus containing hydrocephalic fetus. *Obstetrics and Gynecology*, 31(1):90-96, 1968.

During the last month of pregnancy with a hydrocephalic fetus, an otherwise normotensive woman demonstrated a femoral artery pressure lower than that

in the brachial artery as her aorta was almost totally occluded by pressure of the fetal head as she lay supine. The femoral artery pressure is higher than the brachial in a normal non-pregnant woman, while in the normotensive woman in late pregnancy, the femoral pressure is lowered and equal to the brachial due to uterine compression on the aorta (55-65% stenosis). In this patient, retrouterine occlusion was relieved in the lithotomy (gynecologic) position. Despite prolonged periods of aortoiliac compression, the fetal heart rate and level of oxygenation of fetal blood were normal, suggesting that placental blood flow was maintained via other routes such as ovarian and round ligament arteries. The patient had significant acidosis associated with periods of compression. There were no significant sequelae following craniotomy and extraction of the infant. (21 refs.) - *E. L. Rowan.*

Service of Obstetrical Physiology
School of Medicine
University of Uruguay
Montevideo, Uruguay

272 New problems of myelomeningocele. *British Medical Journal*, 2(5600):258, 1968. (Editorial)

Problems associated with myelomeningocele include the necessity of long-term hospital commitment to perform hydrocephalic and orthopedic operations; therapy for and correction of improper circulation of cerebrospinal fluid and paralyzed lower limbs; early detection and treatment of renal damage; proper care of adolescents including treatment of hypertension resulting from renal problems; and recognition that the knowledge of specialists in various fields is needed in studying and solving new problems. (No refs.) - *J.P. West.*

273 Anencephalus and spina bifida. *British Medical Journal*, 1(5593):660, 1968. (Editorial)

The incidence of anencephalus and spina bifida varies with regional and ethnic groups and is probably more dependent on environmental than genetic factors. Anencephalus occurs commonly in the British Isles, but is 2 to 3 times more common in northwest England, Scotland and Wales, than in the southeast, with a variation of 1/1000 to more than 4/1000. Economics, sex, seasonal status, and the chronological number of children from the same mother are factors which affect the incidence. Spina Bifida cystica shows less epidemiological, seasonal, and sex variation than anencephalus. Studies made on Catholic, Protestant, Jewish, and Irish groups support the hypothesis that the variation in incidence is due to environmental rather than genetic differences. (16 refs.) - *M.T. Lender.*

274 HARE, E. H. Ethical and social aspects of treatment of spina bifida. *Lancet*, 2(7577):1084, 1968. (Letter)

The emotional and physical well-being of the family is an important factor in the treatment of spina bifida infants. Long survival of untreated infants is painful to both patient and family. With treatment death may occur earlier or later; however, a number of such children can survive with only moderate disabilities. Research on treatment methods and efforts to eliminate the disorder should continue. (1 ref.) - *J.P. West.*

The Bethlem Royal Hospital
Beckenham BR3 3BX, Kent
England

275 SCHURR, PETER H. Craniosynostosis. *Developmental Medicine and Child Neurology*, 10(6):789-792, 1968. (Annotation).

The surgical treatment of craniosynostosis reduces deformity of the skull and may aid in preventing or reducing potential mental defects. The condition, which occurs most often in males, may begin *in utero* and sometimes can be detected after birth by palpation or X-rays. Cases of complete neonatal fusion should have surgical treatment immediately as the neonatal brain doubles its weight within 6 months. Early fusion of the sagittal suture occurs most frequently but results in MR less frequently than other types of premature fusion. The coronal sutures may be involved unilaterally or bilaterally and should be treated first in cases of multiple-suture involvement. The premature fusion of the metopic suture (*in utero*) is found in 10% of the cases. The lambdoidal suture fusion is usually associated with the presence of 1 or more premature fusions of other sutures. The detrimental cosmetic and mental effects of craniosynostosis may be eased or prevented with early surgical treatment. (8 refs.) - *M.T. Lender.*

Guy's Maudsley Neurosurgical Unit
Maudsley Hospital
DeCrespigny Park
London S.E. 5, England

276 WINTGENS, M., ROLAND, T., & EVRARD, M. Etude d'un cas de dysplasie fibreuse des os de la face et du crane associee a un retard mental avec epilepsie et surdite unilaterale (Study of a case of fibrous dysplasia of the skull and facial bones associated with mental retardation, epilepsy, and unilateral deafness). *Acta Paediatrica Belgica*, 22(1):29-40, 1968.

Case material from the study of a patient (CA 16 yrs) with fibrous dysplasia of the skull and facial bones associated with various neurological symptoms of common etiology including MR, epilepsy, and unilateral deafness, is presented. The first convulsion was observed at 1 year and IQ was 65-75 at 4-6 years. EEG showed the presence of a centrencephalic irritant and fibrous dysplasia was surveyed using radiology and bone biopsies. The association of fibrous dysplasia with lesions of neuroectodermal tissue places this syndrome among those complex malformations involving several embryonic layers. (16 refs.) - *M.G. Conant.*

No address

277 GROGONO, J. L. Children with agenesis of the corpus callosum. *Developmental Medicine and Child Neurology*, 10(5): 613-616, 1968.

A longitudinal study of 50 patients in England with agenesis of the corpus callosum is described in terms of problems of diagnosis, characteristics and the role of the corpus callosum. In 45 patients the diagnosis was made by pneumoencephalography. Radiography demonstrated the classical features described in the literature including: dorsal extension and dilatation of the third ventricle; wide separation of the lateral ventricles with angular dorsal margins; and dilated posterior horns. Epilepsy and MR were found in most of the children; only 7 seem to be developing normally. The incidence and prevalence statistics indicate that this condition is somewhat rare. Cases that are diagnosed by air studies have sufficient abnormalities to warrant these procedures; thus it is the study of associated clinical abnormalities which is usually responsible for this diagnosis. Corpus callosum agenesis is usually an additional cerebral abnormality associated with problems that initiate the encephalography. (11 refs.) - *B. Bradley.*

London Hospital
Whitechapel
London E.1., England

278 CADMAN, THOMAS E., LEE, YOUNG B., & TUCKER, SAMUEL H. Microcephaly associated with massive chronic subdural effusions. *Journal of Pediatrics*, 73(2):246-247, 1968.

An 8½-month-old infant with microcephaly and massive bilateral subdural effusions is described. A Caucasian girl at 5 mos of age suffered a severe blow to the head and was admitted to the hospital in a semiconscious and cyanotic state; subdural hematoma was diagnosed and the patient was hospitalized for 2 months during which time she suffered intestinal bleeding, anemia, diarrhea, and urinary infection. Six weeks after discharge, she was readmitted because of increasing spasticity and slow psychomotor development. Her head circumference was determined to be below the tenth percentile, the presence of chronic subdural fluid collections was noted, and at craniotomy, the brain appeared small but normal. It was suggested that post-traumatic atrophy had occurred and that the patient's brain had been reduced to 1/3 the size expected for her age due to the large subdural fluid collections. (7 refs.) - *K. Drossman.*

1740 Bainbridge Street
Philadelphia, Pennsylvania

279 GALLOWAY, W. H., & MOWAT, A. P. Congenital microcephaly with hiatus hernia and nephrotic syndrome in two sibs. *Journal of Medical Genetics*, 5(4):319-321, 1968.

Case histories, autopsy findings, and the genetic basis for the occurrence of congenital microcephaly, hiatus hernia, and nephrotic syndrome in 2 sibs are presented. No consanguinity was shown in 4 generations. Congenital nephrosis is invariably fatal and in 1 child was rapidly fatal while the course was slower in the second child. Treatment with steroids did not appear to be effective. Microcephaly in these 2 sibs was thought to be due to an autosomal recessive gene and genetic factors were clearly operative in the occurrence of hiatus hernia; however, the exact nature of inheritance needs to be elucidated. (14 refs.) - *L.E. Clark.*

Department of Child Health
University of Aberdeen
Aberdeen, Scotland

280 BERG, J. M., SMITH, G. F., & McCREARY, B. D. The De Lange syndrome: Diagnostic and aetiological considerations. In: Richards, B. W., ed. *Proceedings of the First Congress of the International Association for the Scientific Study of Mental Deficiency*, held September 12-20, 1967, Montpellier, France. Surrey, England, Michael Jackson Publishing, 1968, p. 209-215.

The diagnosis of the De Lange syndrome depends on the presence of an apparently characteristic combination of clinical anomalies including MR, growth retardation, hirsutism, microcephaly, confluent eyebrows, small nose with anteverted nostrils, micrognathia, small hands and feet, and proximally placed thumbs. The dermatoglyphics are also abnormal and delayed osseous maturation, small skull, and shortened metacarpals have been observed radiologically. The etiology is still uncertain, but it is possible that there is more than 1 clinical entity represented among the nearly 190 reported cases. It is also possible that the syndrome is due to more than 1 cause. (7 refs.) - *M.G. Conant.*

281 LEE, FRED A. Generalized overconstriction of long bones and unilateral Kerner's deformity in a De Lange dwarf. *American Journal of Diseases of Children*, 116(6):599-603, 1968.

An S with severe mental and somatic retardation of the De Lange syndrome also has overconstriction of long bones and unilateral Kerner's deformity. Kerner's deformity is a developmental anomaly, familial in nature, occurring bilaterally, and consisting of dorsal and lateral bowing of the distal phalanges of the fifth fingers. Overconstriction of long bones is caused by medullary canal stenosis and is generalized in this S. (16 refs.) - *L.E. Clark.*

Children's Hospital of Los Angeles
4650 Sunset Boulevard
Los Angeles, California

282 HALL, B., DAHLQUIST, A., & BECK, BENTE. Enzyme activity in De Lange's syndrome, *Lancet*, 1(7555):1317-1318, 1968. (Letter)

Nine patients with De Lange's syndrome had a galactose-1-phosphate uridyl transferase activity (GPUT) in the blood of 33.31± 0.07 units per g Hb (normal, 27.32± 0.57 units per g Hb); this value was lower than

in Down's syndrome. Seven of the patients had normal chromosomes, as did other dysplastic children with a raised GPUT, and no symptoms of De Lange's syndrome. This syndrome appears to be the result of a non-specific action of chromosomal aberrations unconnected with GPUT. (No refs.) - *E. F. MacGregor.*

Institute of Genetics
University of Lund
Lund, Sweden

283 DUNN, HENRY G. The Prader-Labhart-Willi syndrome: Review of the literature and report of nine cases. *Acta Paediatrica Scandinavica*, Supplement 186, 1968.

Seventy cases in the literature and 9 of the author's cases of the Prader-Labhart-Willi syndrome (a syndrome of early obesity, short stature, small digits, MR, and a benign amyotonic neonate state) are reviewed and discussed. In addition to symptoms described by Prader, the present cases include a normal or somewhat enlarged head, delayed dentition, delayed anterior fontanelle closure, severe dental caries, delicate facies, fair or auburn hair, blue eyes, and strabismus. Bone age is retarded in these Ss as are developmental milestones and most Ss demonstrate a pre-diabetic state. Genetic studies are equivocal and further research is needed on the inheritance of this disorder. In treating these patients, the obesity is extremely recalcitrant to treatment and is as much a problem as is the MR. The pre-diabetic state needs to be watched carefully and it is suggested that tolbutamide might prevent exhaustion of the beta-cells of the pancreas. (65 refs.) - *K. Drossman.*

Health Centre for Children
Vancouver General Hospital
Vancouver, British Columbia, Canada

284 RUPPERT, ELIZABETH S., & JOHNSON, ERNEST W. Motor nerve conduction velocities in low birth weight infants. *Pediatrics*, 42(2):255-260, 1968.

Conduction velocity (CV) in ulnar, median, and peroneal nerves of 11 premature and 8 term infants, all with birth-weghts under 2,500 grams, was measured at birth, and in the low birth-weight term infants,CV was 28 to 32 meters/second while in the premature infants CV was between 13 and 27 meters/second. Apparently, the peripheral and the central nervous system mature at a constant rate unaffected by prematurity or intrauterine growtn retardation, and CV is,therefore,an accurate and reliable measurement of gestational age and maturity. Repeated determinations during the first year of life revealed that, while all infants' CVs increased, those of the premature group rose faster with both groups having similar values by age 6 months. (14 refs.) - *D. Martin.*

Ohio State University Hospital
Columbus, Ohio 43210

285 GILBERT, WALTER R., JR., *SMITH, J. LAWTON, & NYHAN, WILLIAM L. The Sjogren-Larsson syndrome. *Archives of Ophthalmology*, 80(3):308-316, 1968.

The first case of Sjogren-Larsson syndrome (a triad of MR, spastic diplegia, and congenital ichthyosis) in which fluorescein angiography was used to study the macular degeneration and fundus changes is described. In addition to the classical triad, a 2-year, 7-month old Negro boy also had decreased ability to sweat, a high arched palate, undescended testes, generalized weakness and spasticity, hyperreflexia, ankle clonus, bilateral extensor plantar responses, profound MR, dorsal lumbar kyphosis, pneumonencephalographic evidence of generalized brain atrophy, mild hypertelorism, variable intermittent esotropia, and clear corneas. Ophthalmoscopy showed bilateral, symmetrical, well circumscribed para-foveal hypopigmentation surrounded with small white flecks. Fluorescein angiography demonstrated a choroidal vascular blush at the fovea but no retinal or subretinal leak. Previously reported cases of this syndrome include a history of consanguinity, speech disorders, dermatoglyphic anomalies, convulsions, widely spaced teeth, dental and osseous dysplasia, IQ ranging from less than 30 to 50, a slow tremor, and a life expectancy of less than 1/2 normal. Fourteen cases among the Haliwas of North Carolina, a consanguineous population of Caucasian, American Indian and Negro ancestry, have been reported previously. (15 refs.) - *R.D. Nunn.*

*1638 Northwest Tenth Avenue
Miami, Florida 33136

286 ROMANES, G. J. Sjogren-Larsson syndrome. *British Journal of Ophthalmology*, 52(2):174-177, 1968.

A 22-year-old man with the Sjogren-Larsson syndrome (MR, spastic diplegia,and ichthyosiform erythrodermia) developed bilateral corneal ulcerations with descemetocoeles which required repeated penetrating keratoplasties bilaterally. At age 16, following treatment with topical steroids, visual acuity was 6/18. The corneas showed a non-specific keratitis, inferior and superior vascularization, central thinning, central stromal scarring, and descemetocoele formation. Just prior to corneal grafting in the right eye, visual acuity was 6/60. Keratoplasty was again performed in the right eye 2 years later following central corneal thinning. Descemetocoele formation and corneal perforation necessitated the keratoplasty in the left eye as did a repeat occurrence 2 years later. This second graft on the left eye had to be reinforced with another donor cornea. Visual acuity in the right eye is now 6/24 with correction. (5 refs.) - *R.D. Nunn.*

Royal Eye Infirmary
Weymouth
England

287 GELLIS, SYDNEY S., & FEINGOLD, MURRAY. Sjogren-Larsson syndrome. *American Journal of Diseases of Children*, 116(6):653-654, 1968.

Four color photographs illustrate characteristics of Sjogren-Larsson syndrome including: congenital ichthyosis, spasticity, and lichenification; MR; and central nervous system disorders. (4 refs.) - *J.P. West.*

Boston Floating Hospital
20 Ash Street
Boston
Massachusetts 02111

288 ESTERLY, NANCY B. The ichthyosiform dermatoses. *Pediatrics*, 42(6):990-1004, 1968.

The 4 major types of ichthyosis are ichthyosis vulgaris (transmitted as an autosomal dominant trait), sex-linked ichthyosis, bullous congenital ichthyosiform erythroderma (CIE) (transmitted as an autosomal dominant trait), and nonbullous CIE (transmitted as an autosomal recessive trait). The 4 forms first appear between birth and 1 year, producing scaling on various parts of the body, and only ichthyosis vulgaris and bullous CIE improve with age. MR is occasionally associated with sex-linked ichthyosis. Harlequin fetus is the severest form of nonbullous CIE and collodion baby is a phenotypic expression of sex-linked ichthyosis and bullous and nonbullous CIE. Ichthyosis linearis circumflexa is a variant of nonbullous CIE, with the absence of palmar and plantar hyperkeratosis, and erythokeratodermia variabilis, the least common form of ichthyosis, produces localized lesions on the face, buttocks, and extensor extremities. Ichthyosis is present as a constant or variable feature in Netherton's syndrome, Refsum's syndrome, Rud's syndrome, and Sjogren-Larsson syndrome, with MR occurring in the last 2 syndromes. It has been postulated that an abnormality of skin lipid metabolism exists in ichthyosis. Diagnosis is not particularly difficult and therapy consists of the application of topical lubricants to hydrate affected skin areas. (87 refs.) - *M. G. Conant.*

LaRabida—University of Chicago Institute
Chicago, Illinois 60649

289 FRIAS, JAIME L., & SMITH, DAVID W. Diminished sweat pores in hypohidrotic ectodermal dysplasia: A new method for assessment. *Journal of Pediatrics*, 72(5):606-610, 1968.

Hypohidrotic ectodermal dysplasia (a sex-linked recessive trait), which is characterized by an inability to sweat, hypotrichosis, and abnormal dentition, is a difficult condition to diagnose in the heterozygote. Because the diminished sweating ability may lead to hyperthermia and permanent brain damage, genetic counseling for afflicted families is of paramount importance and a simple, not unpleasant, method of heterozygote detection is needed. Such a method, based on a diminished sweat pore count in epidermal fingertip ridges, is described. Direct visualization of the fingertip is done with a 7X stereomicroscope, and pore counts are made and compared with normal values. Six families with this disorder were studied using this direct counting method. All affected male Ss lacked epidermal sweat pores and most of the female carriers had a paucity of sweat pores. No evidence for mosaicism of sweat pore distribution was observed. (11 refs.) - *K. Drossman.*

University of Washington
Seattle, Washington 98105

290 KLOSOVSKY, B. N. Development of the brain in cases of disorder of the endocrine glands and viscera during pregnancy. In: Richards, B. W., ed. *Proceedings of the First Congress of the International Association for the Scientific Study of Mental Deficiency*, held September 12-20, 1967, Montpellier, France. Surrey, England, Michael Jackson Publishing, 1968, p.135-139.

Detailed medical examinations of mother and child have indicated that a lesion of an endocrine gland or organ in the mother causes a disturbance in formation and function of the same gland or organ in the child and also exerts a specific influence on the development of the fetal brain. For instance, women with overactive thyroid glands frequently have toxicosis during pregnancy and disorders of the thyroid gland are often present in their children. Mothers with euthyroid goiter frequently give birth to myxodematous children with impaired intellect. The same impairment of gland or organ has been observed in children of women with chronic adrenal hypofunction, diabetes, disturbances of carbohydrate metabolism, and diseases of the liver and kidney. Attention should be given to the institution of prophylactic measures to exclude the birth of defective infants of this type. (No refs.) - *M. G. Conant.*

Gross brain disease (postnatal)

291 GOODALL, JANET, SHINEBOURNE, ELLIOT, & LAKE, BRIAN D. Early diagnosis of familial dysautonomia: Case report with special reference to primary patho-physiological findings. *Archives of Disease in Childhood*, 43(230): 455-458, 1968.

Familial dysautonomia was diagnosed in a 6-year-old girl with feeding difficulties, heavy breathing, grey skin color, and opisthotonus. Reflexes and muscle tone were poor and the diastolic blood pressure was extremely unstable with excitement, ranging from 35 to 135 mm mercury. Development was delayed and feeding difficulties were still prevalent at 2 years of age. Rolling over was first accomplished at 9 months, reaching and grasping at 10 months, and sitting unsupported at 15 months. Pilocarpine treatment was begun at 5 months of age with no significant improvement; however, intravenous injections of metacholine caused a drop in blood pressure and heart rate, and increased tone and local and spinal reflexes. Noradrenalin increased blood pressure and heart rate, indicating that the normal reflex bradycardia did not occur. Skin and rectal biopsies were normal. It was assumed that acetylcholine and catecholamine metabolism was normal but that a functional defect at the level of the cell membrane was present. (23 refs.) - *M.T. Lender.*

Sheffield Children's Hospital
Sheffield 10, England

292 CHOUSSAT, C. La leucodystrophie metachromatique (Metachromatic leukodystrophy). *Medecine Infantile.* 74(2):121-132, 1968.

Metachromatic leukodystrophy (MLD), a hereditary and progressive degeneration of the white matter, is discussed in terms of clinical aspects, laboratory tests, anatomical pathology, physiopathology, nosology, differential diagnosis, and treatment. MLD usually appears in children at age 18-24 months and the diagnosis is confirmed by the presence of metachromatic granulations and sulfatiduria and absence of arylsulfatase A in the urine. (7 refs.) - *M.G. Conant.*

293 FOGELSON, M.HAROLD, GONATAS, NICHOLAS K., RORKE, LUCY BALIAN, & SPIRO, ALFRED. Oligodendroglial lamellar inclusions: In a probable variant of metachromatic leukodystrophy. *Archives of Neurology*, 19(2):150-155, 1968.

The case of a 5-year-old boy with clinical findings of late infantile metachromatic leukodystrophy (MLD) but with normal urinary arylsulfatase "A" enzyme levels and normal-appearing brain tissue under light microscopy is presented. Under electron microscopy, unusual oligodendroglial inclusions were found which appeared as osmiophilic bodies 2 to 4μ in diameter containing stalks of linear densities with constant thickness and periodicity. Such inclusions have been observed in documented cases of late infantile MLD. Characteristics of the 4 groups of MLD are reviewed, and it is suggested that the case presented is either a genetic variant or an early form of late infantile MLD. (22 refs.) - *D. Martin.*

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294 Ferreting out the cause of SSPE. *New England Journal of Medicine*, 279(15):830, 1968. (Editorial)

While many virologists have concluded that subacute sclerosing panencephalitis is closely associated with the measles virus, a new study in which the investigators used an EEG as a virus indicator system suggests that another agent may be responsible. Although it is an unorthodox means of virus study, the EEG findings when correlated with the pathologic changes are impressive and indicate that the final etiological basis for the disease is not yet certain. (1 ref.) - *E. Gaer.*

Psycho-environmental

295 SCALLY, B.G. The offspring of mental defectives. In: Richards, B. W., ed. *Proceedings of the First Congress of the International Association for the Scientific Study of Mental Deficiency*, held September 12-20, 1967, Montpellier, France. Surrey, England, Michael Jackson Publishing, 1968, p. 246-255.

The 887 pregnancies of 342 mental defectives in Northern Ireland known to have married and/or produced offspring (including miscarriages and abortions) were surveyed as to number of mentally defective children. There were 60 miscarriages, 36 stillbirths, and 71 deceased children from this group. Of the 720 living offspring, 10.8% were mentally defective and 13.6% were retarded. The mentally defective parent classed as familial (Grade II) had 42.4% of offspring that were MR or educationally subnormal, compared to 14.1% for the offspring of undifferentiated parents (Grade I) and 18.2% for the offspring of all other parents. (27 refs.) - *M.G. Conant.*

296 WALD, I., LOESCH-MDZEWSKA, DANUTA, PILINOW, ANNA, & ZAREMBA, J. Incest and mental retardation. In: Richards, B. W., ed. *Proceedings of the First Congress of the International Association for the Scientific Study of Mental Deficiency*, held September 12-20, 1967, Montpellier, France. Surrey, England, Michael Jackson Publishing, 1968, p. 105-112.

The 329 cases of incest on court records in Poland during 1960-1965 were surveyed with respect to family pattern. In 75% of the cases, the incest was between father and daughter and, in general, the families were characterized by poor mental and social development. The fathers showed increased submissiveness and insecurity and decreased surgency, perseveration, responsibility, and emotional stability, and the females showed increased cyclothymic tendencies and conventionalism and decreased surgency. In the second part of the study, 29 incestuous births (14 girls and 15 boys) were examined. There was 1 stillbirth with multiple developmental abnormalities and 4 deaths before the age of 3 years. Of the surviving 24 children, 15 were normal, 2 showed dullness, 5 mild, 1 moderate, and 1 profound MR. The data represent detectibility rather than true incidence of incest, and suggest that the reduction of fitness and the observed handicap may be produced in a polygenic manner. (13 refs.) - *M.G. Conant.*

297 DRILLIEN, C. M. Obstetric factors and mental handicap. In: Richards, B. W., ed. *Proceedings of the First Congress of the International Association for the Scientific Study of Mental Deficiency*, held September 12-20, 1967, Montpellier, France. Surrey, England, Michael Jackson Publishing, 1968, p. 113-124.

The obstetric history of the mother, the severity of the defect, classification as to clinical type, and socioeconomic status were examined in 406 children born in 1950-1956 with IQ test scores below 70. The mentally subnormal children who had no other defects, from poor and very poor homes, were not associated with obstetric abnormalities of the mother; the subnormality is probably due to a combination of heredity and environment. Subnormal children who had no other defects and were from adequate homes showed an increased incidence of low birth-weight, premature delivery, and maternal infertility. Severe complications of labor and delivery were noted in the group of Ss who had combinations of epilepsy, cerebral palsy, and congenital anomalies. The complications were associated with the neurological defect, not the mental handicap; this may be due to some physiological disturbance in the mother. (4 refs.) - *M.G. Conant.*

298 SKODAK, MARIE. Adult status of individuals who experienced early intervention. In: Richards, B. W., ed. *Proceedings of the First Congress of the International Association for the Scientific Study of Mental Deficiency*, held September 12-20, 1967, Montpellier, France. Surrey, England, Michael Jackson Publishing, 1968, p. 11-18.

The effect of early intervention in the form of a highly stimulating environment and a warm, affectionate relationship with a parent or parent substitute was evaluated retrospectively for 3 groups of children from an orphanage. The first group, which was classified as MR at an early age, was placed in the stimulating environment of the adult section of an institution for the MR. The second group, whose mothers were known to be MR, was adopted at an early age. The children in both these groups attained normal intelligence by school age and, as adults, had an average or better education and vocational status. The third group, children of normal intelligence, lived a neglected, barren existence in the orphanage and showed a significant, permanent deterioration in intelligence, which became irreversible. Apparently, even within genetic limits, the effect of environmental experience can be immense. (3 refs.) - *M.G. Conant.*

299 RAJALAKSHMI, R. The psychological status of under-privileged children reared at home and in an orphanage in South India. *Indian Journal of Mental Retardation*, 1(2):53-61, 1968.

Children living in an orphanage in South India and children living in their own homes in a small village near the orphanage were tested for psychological performance. Both groups showed very poor word concept development and both made poor scores on the Leiter International Scale. The orphanage children scored even lower than the children who were living at home. Those children that were receiving a high protein supplement as part of the experiment were found to do no better than those receiving an isocaloric carbohydrate supplement. The results showed that nutritional improvement alone does not restore normal psychological functioning in children whose social and cultural environment is totally lacking in emotional and psychological stimulation. (10 refs.) - *B. Parker.*

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300 DUCHE, D. J., & LORTHOLARY, O. Les arrieres profonds psychotiques: les traits psychotiquiesdes arrieres profonds (Severe psychotic mental deficiency: Psychotic traits in severe mental deficiency). In: Richards, B. W., ed. *Proceedings of the First Congress of the International Association for the Scientific Study of Mental Deficiency*, held September 12-20, 1967, Montpellier, France. Surrey, England, Michael Jackson Publishing, 1968, p. 140-146.

Observation of 100 institutionalized severely retarded children revealed regression accompanied by psychotic traits, the latter probably corresponding to the deep emotional trauma due to lack of a warm relationship with the environment. The psychotic characteristics observed include behavioral anomalies, language disturbances, stereotypes, hallucinations, sleep problems, and non-neurological muscle tone problems. Only after long observation in controlled surroundings can a distinction be made between chronic psychotics and children whose behavior includes psychotic traits which will disappear after reeducation. (No refs.) - *M. G. Conant.*

301 CRAMOND, W. A. Organic psychosis. *British Medical Journal*, 4(5629):497-500, 1968.

Although the symptoms of organic and acute psychoses are similar, the methods of treatment and management vary according to the underlying physical disorder. There are 3 major symptoms of organic psychosis: disorders of cognition, disorders of mood, and disorders of behavior. The patient with acute organic psychosis is best treated by a combination of drugs and therapy. His surroundings must be conducive to the prevention of anxiety; slowness of movement in attending personnel is of utmost importance. As the organic disorder is brought under control, the psychosis will diminish and the use of drugs can be reduced. The patient with chronic organic psychosis is given drugs only on a limited basis, as they may worsen the condition. He should be treated in a familiar environment to reduce anxiety. As his condition deteriorates, he will require an increasing amount of understanding care. At no time must he be treated brusquely or put down for his failings in behavior and hygiene. (No refs.) - *S.L. Hamersley.*

University of Adelaide
Adelaide, South Australia

302 JUDD, LEWIS, & MANDELL, ARNOLD J. Chromosome studies in early infantile autism. *Archives of General Psychiatry*, 18(4):450-457, 1968.

Karyotypic analysis carried out on 8 boys and 3 girls with infantile autism (Kanner's syndrome) revealed no abnormality other than a long Y-chromosome in 3 of the boys and this was also present in the normal father of 2 of them (brothers). The Y-chromosome need not be the same length as chromosome 21 (Denver classification) but may be normally large and its size is inheritable. Hereditary factors in the etiology of early infantile autism are suggested by a high concordance rate among homozygous twins afflicted with autism, but a genetic influence has not been demonstrated within the limits of present cytogenetic technique. The association between autism and a long Y-chromosome is apparently coincidental. (26 refs.) - *E.L. Rowan.*

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MEDICAL ASPECTS—CONVULSIVE DISORDERS

303 LEIBOWITZ, U., & ALTER, M. Epilepsy in Jerusalem, Israel. *Epilepsia*, 9(2):87-105, 1968.

An epidemiologic investigation of epilepsy in Jerusalem revealed the prevalence rate was 4.1/1,000 population and was close to similar studies in other communities. The epileptic was defined as a patient who had been diagnosed as having: epilepsy unspecified (including epilepsia tarda); convulsions, grand mal, petit mal, Jacksonian seizures, psychomotor or temporal lobe seizures; and non-convulsive attacks, such as febrile convulsions, syncope and breath holding fits. In the 1,027 cases studied, 689 were convulsive, 117 were febrile, and 221 were non-convulsive. The Ss were determined from January 1958 through December 1961 from hospital and clinical records, EEGs, and interviews with physicians. Apparently, the frequency of idiopathic epilepsy does not differ in diverse populations. The grand mal was diagnosed as the most frequent seizure and petit mal, temporal lobe epilepsy,

and Jacksonian seizures accounted for less than 1/2 the cases. More males had grand mal, but more females had petit male and Jacksonian seizures. In 44% of the epilepsy patients, seizures began during the first 5 years of life, 78% of the patients had a seizure before 20 years, 16% between 20 and 40 years, and 6% after 40 years. Although 2/3 of the patients with petit mal had abnormal or borderline EEGs, only 1/2 of the Ss with grand mal seizures had abnormal recordings. Drugs frequently used in the anticonvulsant treatment were diphenylhydrantoin and phenobarbital; trimethadione and primidone were frequently given to Ss with petit mal. (30 refs.) - *F.J. McNulty.*

Hadassah University Hospital
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304 SCIORTA, ANTONINO, & ZIRILLI, GIOVANNI. Sulla diagnosi di epilettoidismo in psichiatria infantile (Diagnosis of epileptoidism in infantile psychiatry). *Quaderni di Infanzia Anormale*, 95(Supplement 13):1-79, 1968.

A review on infantile epileptoidism is made and the etiology in 25 children with characteristic epileptoid-type disturbances is discussed. The importance of this disease as a nosological and clinical entity is emphasized. The diagnosis of epileptoidism includes a medical history (family and personal), and general somatic, neurological, psychic, electroencephalographic, and Rorschach test examinations. A single positive test is inconclusive, but integration of the data provides a high degree of assurance in the diagnosis. Epileptoidism is usually associated with neurotic manifestations. Diagnosis and treatment of epileptoidism early in life is indicated for a prophylaxis of criminality. (133-item bibliog.) - *G. Pura.*

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305 CIZKOVA, JIRINA. Endocrinological aspects of convulsions in the neonatal period. In: MacKeith, Ronald, & Bax, Martin, eds. *Studies in Infancy*. London, England, Spastics International Medical Publications, 1968, p. 67-69.

Although convulsions during the newborn period suggest a disturbance of the central nervous system, they may be the first sign of an endocrinological disturbance. Congenital goiter as a result of thyroid deficiency may cause obstructive respiratory distress and convulsions secondary to neonatal anoxia. Temporary hyperthyroidism (usually in mothers on thyroid medication) and transient hypoparathyroidism may also present with seizures. Acute adrenal insufficiency with Addisonian crisis accompanied by convulsions may be seen in adrenocortical hyperplasia, female pseudohermaphroditism, adrenogenital syndrome, and congenital hypoplasia of the adrenal glands. Hypoglycemic convulsions may occur in infants of diabetic mothers, infants with idiopathic hypoglycemia, and low birth-weight infants who cannot mobilize carbohydrate reserves. (8 refs.) - *E.L. Rowan.*

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306 PAINE, RICHMOND. Characteristics of fits in the newborn period. In: MacKeith, Ronald, & Bax, Martin, eds. *Studies in Infancy*. London, England, Spastics International Medical Publications, 1968, p. 70-77.

Neonatal convulsions differ in cause, characteristics, management, and prognosis from those in adult life. Seizures are usually clonic in character and frequently localized on one occasion but occurring in other areas on subsequent occasions. Perinatal anoxia and birth trauma are perhaps the most frequent causes of seizures in the newborn, but biochemical defects, infection, and metabolic causes, especially tetany and hypoglycemia, are also common. Rare aminoacidurias. pyridoxine dependency, and kernicterus are also associated with convulsions. Phenobarbital and paraldehyde are the drugs of choice (diphenylhydantoin is too sedative and requires 72 hrs to reach therapeutic levels). The advisability of using intravenous glucose and/or hypothermia is unsettled. Neonatal fits are followed by an increased statistical risk of residual brain damage (cerebral palsy, MR, and epilepsy) and approximately 1/2 of these infants will have some neurological abnormality demonstrated later in childhood. (38 refs.) - *E.L. Rowan.*

Children's Hospital of the
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Washington, D. C. 20009

307 SYNEK, V. Low-voltage electrocephalogram in epilepsy. *Confina Neurologica*, 30(3):201-207, 1968.

A low-voltage EEG is compatible with epilepsy as demonstrated in 6 Ss with a history of seizures and persistently low-voltage tracings who were subjected to various activating techniques. Although hyperventilation was ineffective in changing the EEG record, spike and wave discharges occurred in 1 patient after photic stimulation, in 3 during bemegride administration (80-100 mg) and in 1 awakening from pentobarbital-induced sleep. Low-voltage may occur in epileptics with sporadic attacks, especially those whose "late onset" seizures are attributable to trauma or cerebrovascular pathology and such voltage may be a function of the remoteness of scalp electrodes from electrical activity and the resistance of interstitial tissue. (25 refs.) - *E.L. Rowan.*

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308 FRICKER, JEAN. Les epilepsies (Forms of epilepsy). *La France Medicale*, 31(9):443-452, 1968.

The various forms of epilepsy, including generalized, hemigeneralized, partial, and psychomotor epilepsy and their varieties, are discussed in terms of clinical description, diagnosis, etiology, differential diagnosis, and treatment. Epilepsy is both a syndrome (genetically transmitted or acquired due to a metabolic disorder) and a symptom caused by cerebral lesions during the prenatal, perinatal, or postnatal periods. Diagnosis of any form of epilepsy requires clinical, electroencephalographic, biological, and radiologic data

to make a precise diagnosis and to distinguish the disorder from hysteria, hypoglycemia, or tetany. Drug therapy is effective in the treatment of the syndrome, while surgery is often required in the treatment of the symptom. (No refs.) - *M.G. Conant.*

309 Today's drugs: Drug treatment of epilepsy. *British Medical Journal*, 2(5601):350-353, 1968.

Drug treatment of seizures is only part of the management of the epileptic; education, provision of special services, and control of endogenous and exogenous provocative factors are also important. The physician must be willing to accept a level of seizure control congruent with good mental function and strive not to overmedicate in attempts to make the patient seizure-free. For the control of grand mal attacks, phenobarbitone (phenobarbital) is the drug of choice. This may be supplemented by phenytoin (diphenylhydantoin) and if this combination is ineffective, primidone or the combination of primidone and diphenylhydantoin, may be substituted. Petit mal responds best to suximides (ethosuximide-Zarontin is the drug of choice) and diones. Paraldehyde and diazepam are most efficacious in status epilepticus and steroids or nitrazepam (Mogadon) in infantile spasms. The physician should be aware of the toxic side-effects of these medications and alert to their occurrence.(16 refs.) - *E.L. Rowan.*

310 SAWYER, GLEN T., WEBSTER, DAVID D., & SCHUT, LAWRENCE J. Treatment of uncontrolled seizure activity with diazepam. *Journal of the American Medical Association*, 203(11):913-918, 1968.

Seizure activity that fails to respond to standard anticonvulsants may be controlled with diazepam alone, or in conjunction with other agents. Thirty-one cases of prolonged seizure in 26 patients were treated with diazepam. The adult doses used were between 4 and 20 mg parenterally, and doses of 1 to 7 mg parenterally were used for children, followed by intramuscular doses of 5 to 10 mg/3 hours in both adults and children. Ten of 11 patients who had chronic or progressive central nervous system disorders had an immediate cessation of seizures after parenteral treatment and 1 had partial relief and was relieved with subsequent injections. Of 15 patients with acute cerebral disorders, only 5 had good seizure control for more than 1 day. EEG studies generally revealed a lower voltage and sharp spike cessation after treatment responses in the "acute" patients. The incidence of side effects was low, but 1 patient may have developed a tolerance to diazepam. The adjustment of dosage is important, and when used properly, diazepam is among the safest and most effective drug for control of rapidly recurring seizures. (7 refs.) - *M.T. Lender.*

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311 KUTT, HENN, & McDOWELL, FLETCHER. Management of epilepsy with diphenylhydantoin sodium. *Journal of the American Medical Association*, 203(11):969-972, 1968.

The administration of 300 mg/day of diphenylhydantoin to control epileptic seizures results in the drug stabilizing in the blood at levels of 5 to 15 μg/ml (average 10 μg/ml) after 5 to 15 days. Administration of 400 mg/day gives blood levels of 10 to 25 μg/ml (average 20 μg/ml) and 500 mg/day give blood levels of 20 to 40 μg/ml (average 30 μg/ml). Rapid achievement of stabilized blood levels can be obtained with 1,000 mg intravenously, but the physician must proceed slowly and carefully. Nystagmus, ataxia, and general lethargy usually develop at drug blood levels above 20 μg/ml, 30 μg/ml, and 40 μg/ml, respectively. A small number of patients have low tolerance levels to diphenylhydantoin due to congenital diphenylhydantoin parahydroxylase deficiency, liver disease, or metabolic interference by other drugs (usually isoniazid and amino salicylic acid). In all 3 situations, a reduction of drug intake to 100 to 200 mg/day was effective in maintaining therapeutic levels. Small groups of patients who do not respond to doses up to 600 mg/day include those in whom no anticonvulsant effect is produced (low drug blood levels and no intoxication) and those who continue to have seizures despite the high blood levels of diphenylhydantoin. The latter usually have structural brain disease and the seizures are often better controlled with a combination of anticonvulsants. (18 refs.) - *D.S. Plaut.*

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MEDICAL ASPECTS—CHROMOSOMAL

312 SUMMITT, ROBERT L. Cytogenetics in mentally defective children with anomalies: A controlled study. *Journal of Pediatrics*, 74(1):58-66, 1969.

Chromosome preparations on 50 normal adult controls and 50 MR children with at least 3 congenital anomalies of other organ systems were randomized, coded, and blindly scored. The adult controls showed no chromosomal abnormalities, while 4 children had abnormal karyotypes: 1 was mosaic for an extra small ring chromosome, 1 had a 2-3 translocation, 1 was clinically undiagnosed 18-trisomy, and 1 had a partial deletion of the long arm of 18. At 27 months of age, the male patient with mosaicism had a developmental quotient of 40, and a year later, a cleft soft palate,

generalized muscular hypertonicity, 35% cutaneous syndactyly of the second and third toes of both feet, hypoplastic dermal ridges, and asymmetry of the head were observed. The female patient with 18-trisomy had congenital heart disease, multiple anomalies, and SMR. The male patient with partial deletion of the long arm of chromosome 18 had profound MR, inguinal hernia, facial anomalies, and absence of speech. The case of 2-3 translocation has been reported previously. A causal relationship between chromosomal abnormalities and phenotypes is probable. (13 refs.) - *M.G. Conant.*

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313 TURPIN, R., ECK, M., & TURPIN, J.C. Remarques sur le characteres neuro-psychiques et biochimiques de certaines aberrations chromosomiques (Observations on the neuro-psychiatric and biochemical characteristics of some chromosomal aberrations). In: Richards, B.W., ed. *Proceedings of the First Congress of the International Association for the Scientific Study of Mental Deficiency*, held September 12-20, 1967, Montpellier, France. Surrey, England, Michael Jackson Publishing, 1968, p. 66-73.

Mongolism (trisomy 21), trisomy D, trisomy E, and the *cri-du-chat* syndrome are discussed with respect to the neuropsychiatric aspects, EEG patterns, central nervous system (CNS) anomalies, karyotype, and biochemical aspects. Mongolism, including the true homogeneous type, is characterized by a specific phenotype, nonspecific EEG and CNS anomalies, and a karyotype with 47 chromosomes with an acrocentric G chromosome. Trisomy D is characterized by no psychomotor development, arhinencephaly, and trisomy of chromosome 13. Trisomy E, characterized by very profound oligophrenia, involves chromosome 18. The *cri-du-chat* syndrome, characterized by profound oligophrenia and microcephaly, involves deletion on the short arm of chromosome 5. (39 refs.) - *M.G. Conant.*

314 HSIA, DAVID YI-YUNG, INOUYE, T., MONTELEONE, PATRICIA, NADLER, H.L., SHIH, L.Y., TILLMAN, P., & WONG, P. Enzyme changes in autosomal trisomy syndromes. In: Richards, B.W., ed. *Proceedings of the First Congress of the International Association for the Scientific Study of Mental Deficiency*, held September 12-20, 1967, Montepellier, France. Surrey, England, Michael Jackson Publishing, 1968, p. 194-208.

A review of the literature concerning enzymatic changes in autosomal trisomies in whole blood and its components indicates that no evidence exists which establishes specific genetic loci for enzymes in chromosome anomalies. In Down's syndrome, there is increased activity of galactokinase and galactose-1-phosphate uridyl transferase in whole blood, increased activity of these 2 enzymes in addition to glucose-6-phosphate dehydrogenase (G-6-PD) and phosphohexokinase in red blood cells, and increased activity of galactose-1-phosphate uridyl transferase, G-6-PD, acid phosphatase, and alkaline phosphatase in white blood cells. These increases appear to be related to a specific but generalized phenomena of circulating blood cells which is characteristic of Down's syndrome. In trisomy 18, there is increased activity of alkaline phosphatase and decreased activity of G-6-PD in leukocytes; alkaline phosphatase is increased in Klinefelter's syndrome and decreased in chronic myelogenous leukemia. (38 refs.) - *M.G. Conant.*

315 TAYLOR, ANGELA I. Cell selection in vivo in normal/G trisomic mosaics. *Nature*, 219(5158):1028-1030, 1968.

Peripheral blood cultures and skin fibroblasts were examined in 11 normal/G trisomic mosaic patients in order to determine the stability of the cell proportions. Fifty or 100 cells from each culture were randomly chosen and analyzed. The proportion that was found in the blood correlated with that of the skin in all but 2 Ss who had more trisomic cells in the skin. The ratio changed with time in children, but remained constant in 3 adults, and ranged from nearly 0% normal cells to nearly 100% normal. Normal cells are selectively favored *in vitro*, and it is indicated that selection for the normal cells took place in 5 of 8 children examined. Three children showed trisomic cell selection in which the relative number of trisomic cells increased with time. Gestation time and birth-weight studies suggest that the 3 children with the greater relative number of trisomic cells had retarded growth *in utero*. (6 refs.) - *M.T. Lender.*

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316 LEJEUNE, J., LAFOURCADE, J., RETHORE, MARIE-ODILE, BERGER, R., ABONYI, D., DUTRILLAUX, B., & CAYROCHE, P. Translocation t(1p+;2p-) identique chez une femme et son fils arrieres mentaux (Identical t[1p+;2p-] translocation in a mentally retarded mother and son). *Annales de Genetique*, 11(3):177-180, 1968.

Clinical observations, dermatoglyphs, and karyotypes for a 4-year-old boy and his 29-year-old mother are reported. Both patients show similar MR, cranio-facial morphology, and dermatoglyphs and both are carriers of a t(1p+;2p-) translocation as determined by examination of 15 and 9 mitoses, respectively. The observed anomalies indicate that the chromosomal rearrangement produced a quantitative variation of the genetic material and that the translocation is unbalanced. An identical chromosomal lesion transmitted from mother to son is postulated to explain the clinical findings. (No refs.) - *M.G. Conant.*

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Paris-6e, France

317 LEJEUNE, J., RETHORE, MARIE-ODILE, BERGER, R., ABONYI, D., DUTRILLAUX, B., & SEE, G. Trisomie C partielle par translocation familiale t(Cq+;Cq-) (Partial trisomy C by familial translocation t[Cq+;Cq-]). *Annales de Genetique*, 11(3):171-175, 1968.

Partial trisomy C (46,Cq+) was found by postmortem karyotype analysis of a polymalformed male neonate. Karyotype analysis of 4 generations of this family revealed the transmission of the translocation t(Cq+;Cq-), with 7 of the 8 carriers being female. Clinical malformations reported as associated with partial trisomy for the long arm of a C chromosome include harelip, macroglossia, micrognathism, hypertelorism, congenital cardiopathy, renal abnormalities, and low-set ears; however, no clear-cut syndrome is recognizable. (6 refs.) - *M. G. Conant.*

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Paris-6e, France

318 EMERIT, INGRID, DE GROUCHY, J., & GERMAN, J. Deletion du bras court d'un chromosome 13 (Deletion of the short arm of chromosome 13). *Annales de Genetique*, 11(3):184-186, 1968.

Clinical and cytogenetic observations on a 21-year-old male MR with coarctation of the aorta are reported. The parents were normal and the proband showed no other abnormalities. Karyotype analysis revealed deletion of the short arm of chromosome 13 to give a U- or V-shaped chromosome. This chromosome anomaly has also been observed in normal persons without phenotype consequence. (14 refs.) - *M.G. Conant.*

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Paris-14e, France

319 NAKAGOME, YASUO, WARKANY, JOSEF, & RUBINSTEIN, JACK H. Mental retardation, absence of patellae, and other malformations with chromosomal mosaicism: A follow-up report. *Journal of Pediatrics*, 72(5):695-697, 1968.

A 12-year-old boy, previously diagnosed as mosaic with an extra chromosome which resembled a large acrocentric of the 13-15 group, was reexamined by autoradiographic methods. The boy, who was in the twenty-fifth height percentile, third to tenth weight percentile, below the third head circumference percentile, lacking patellae, and borderline to mildly retarded, was found to have an extra chromosome that did not replicate as quickly as expected for a D group chromosome. In addition, the patient did not show any clinical signs of D_1 trisomy. The partial trisomy may be of the A, B, or C group chromosomes. (6 refs.) - *M. T. Lender.*

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320 ZUELZER, WOLF W., THOMPSON, RUBY I., & MASTRANGELO, RENATO. Evidence for a genetic factor related to leukemogenesis and congenital anomalies: Chromosomal aberrations in pedigree of an infant with partial D trisomy and leukemia. *Journal of Pediatrics*, 72(3):367-376, 1968.

Chromosomal studies of relatives of a female infant with myeloblastic leukemia and clinical and cytogenetic findings consistent with partial D_1 trisomy with an unbalanced chromosomal translocation were undertaken. All relatives were healthy and normal except for the maternal grandmother who was born with a harelip and who had persistent slight leukocytosis and lymphocytosis. Cytogenetic studies on the family members showed normal karyotypes with no translocations, but the mother, her twin brother, and the maternal grandmother showed chromatid exchanges usually accompanied by breakage, endoreduplications, and occasionally acentric fragments. It is proposed that the chromosomal aberrations reflected a genetic factor acting in the manner of a "breakage gene" and producing an unstable genome which resulted in a variety of anatomic and physiologic abnormalities. Such a gene may constitute a link between cytogenetic abnormalities and leukemogenesis. (18 refs.) - *M.G. Conant.*

The Child Research Center of Michigan
Detroit, Michigan

321 PALMER, CATHERINE G., FAREED, NUZHAT, & MERRITT, A. DONALD. Ring chromosome 18 in a patient with multiple anomalies. *Journal of Medical Genetics*, 4(2): 117-123, 1967.

A 10-year-old white male with ring chromosome 18 was found to have motor and mental retardation, as well as congenital ocular, facial, cardiac, and skeletal anomalies which resembled other previously reported cases and some cases with a partial deletion of chromosome 18. The patient was the fourth child of healthy, normal parents and his siblings were normal. Motor and mental development were retarded and multiple physical anomalies were present including: microcephaly, low-set ears, webbed neck, hypertelorism, and clubbed fingers and toes. Dermatoglyphic studies on the proband revealed t axial triradius and whorls on 6 out of 10 fingers. Chromosome studies on leukocyte and fibroblast cultures demonstrated a predominance of cells with 46 chromosomes and a ring chromosome 18. Not all abnormalities reported in previous cases were found in the present case and not all the findings here have been previously reported because a ring chromosome is formed by breakage and deletion of a part of the arms and then refusion and the abnormalities which result will be dependent upon the area deleted. (46 refs.) - *E. Gaer.*

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Indiana School of Medicine
Indianapolis, Indiana 46207

322 FEINGOLD, MURRAY, & SCHWARTZ, ROBERT S. IgA and partial deletions of chromosome 18. *Lancet*, 2(7577):1086, 1968. (Letter)

The question of IgA deficiency and its link with partial deletions of chromosome 18 remains unanswered. In determinations done on patients with *cri-du-chat*, ring chromosomes, long arm deletions on the D chromosome, and X chromosome ploidy, IgA levels were found to be normal; therefore, at the present time, only chromosome 18 has been implicated in immunoglobulin abnormalities. (2 refs.) - *K. Drossman.*

Tufts University School of Medicine
Boston, Massachusetts 02111

323 SPARKES, ROBERT S., CARRELL, ROBERT E., & WRIGHT, STANLEY W. Partial F trisomy and parental chromosomes. *Lancet*, 1968. (Letter)

A family is described in which the father has a normal karyotype, the mother has a balanced translocation of a partially deleted F-group chromosome and 3 live children show MR, peculiar facies, but no demonstrable chromosomal abnormalities. Four spontaneous abortions were twin pregnancies; the relation of this high incidence of twinning with this chromosomal abnormality is unknown. Parental karyotypes should be investigated when there is more than 1 affected sib in a family. Such investigations may discover persons with balanced translocations and since these balanced translocations can result in abnormal offspring, genetic counseling would be in order. (No refs.) - *K. Drossman.*

University of California
of Los Angeles
Los Angeles, California 90024

324 STIMSON, CYRUS W. Translocation and familial mongolism. *Michigan Medicine*, 66(10):1255-1258, 1967.

Although 96% of Down's syndrome patients have 47 chromosomes in somatic metaphase cells representing simple non-disjunction and trisomy, a small percentage of mongoloids have a "normal" number (46) of chromosomes at somatic metaphase. It is not possible to arrange these chromosomes into a normal pattern and it has been determined that reciprocal translocation has occurred in 1 parent of these Ss. Laboratory tests to detect these carrier parents are now feasible and should be performed, for parents carrying such translocations are very likely to produce mongoloid children. (10 refs.) - *K. Drossman.*

Plymouth State Home and Training School
Northville, Michigan 48167

325 BISHUN, NUTAN P. Normal/trisomy C mosaicism in the mother of a "mongoloid" child. *Acta Paediatrica Scandinavica*, 57(3):243-244, 1968.

A case study of a 1-year-old "mongoloid" boy and his 27-year-old mother revealed that the mother was a balanced translocation carrier. The boy, who had 2 normal sibs, had all the clinical characteristics of Down's syndrome and had a 47/XY trisomy 21 karyotype. The mother was phenotypically normal, but karyotype studies showed her to have 46/XX/47XX trisomy C mosaicism. It can be assumed that the mother, who had had 1 previous abortion, had the same mosaicism in her gametogenic tissues. (7 refs.) - *M.T. Lender.*

Institute of Child Health
30 Guilford Street
London W.C. 1, England

326 GIORGI, P. L., PACI, A., CECCARELLI, M., & VIZZONI, L. A new case of incomplete Down syndrome with partial trisomy 21. *Helvetica Paediatrica Acta*, 5(23):540-545, 1968.

Partial G21 trisomy has been found to be associated with Down's syndrome in a 20-month-old boy. Examination revealed definite, but slight, symptoms of Down's syndrome with normal palmar main lines and a radial loop in the hypothenar area of the right hand. The parents had normal karyotypes while the boy had a 47 modal chromosome number with an acrocentric chromosome which was satellited in 4 metaphases and smaller than a G21. It is possible that both non-disjunction and deletion occurred in one or the other parent to produce the 47,XY,21(q−)+ offspring. (8 refs.) - *M.T. Lender.*

Institute di Clinica Pediatrica
Universita di Pisa
Pisa, Italy

327 WEISS, LESTER, & WOLF, CHARLES B. Familial C/G translocation causing mitotic nondisjunction: A cause of familial mosaic Down's syndrome. *American Journal of Diseases of Children*, 116(6):609-614, 1968.

A balanced C/G translocation was found to be associated with mitotic nondisjunction in a family in which 2 children had Down's syndrome involving 21 normal/21-trisomic mosaicism and balanced C/G translocation. One child had first degree hypospadias, a preductal coarctation of the aorta, a patent ductus arteriosus, and purulent meningitis and this child died at 15 days of age. The affected sibling had a developmental level of 36 months at 9 years of age. The karyotypes of both were 46/47 mosaic, with a small acrocentric chromosome. A C group chromosome was replaced by an odd sized chromosome with a median centromere. The father's karyotype was normal; however, the mother and another sibling had a modal chromosome number of 46 with 3 normal-appearing G chromosomes and 1 smaller than those of the D group. The same small acrocentric chromosome and the chromosome that replaced 1 from the C group were also present. The balanced translocation present in the mother may have caused an increased incidence of mitotic nondisjunction. (13 refs.) - *M.T. Lender.*

Henry Ford Hospital
Detroit, Michigan 48202

328 EVANS, D.A. PRICE, WREN, P.J.J., DONOHOE, W.T.A., BULLEN, M.F., LEWIS, MARION, KAITA, HIROKO, CHOWN, BRUCE, & UCHIDA, IRENE. Further observations on Kell blood groups in families ascertained via a mongol propositus. *Journal of Medical Genetics*, 5(4):310-313, 1968.

The Kell blood groups were determined in 2 separate populations of mongoloids and their sibs in order to ascertain if the loci for the Kell group is on chromosome 21. Confirmed trisomics and their relatives were studied only if the Kell groups were determined in both parents. Controls were matched socioeconomically, culturally, and by sex, age, and location. A group of 278 controls and their family members and a total of 469 mongoloids and their families, in 3 groups, indicated no difference in Kell group frequency. Furthermore, there was no difference between the mongoloids and their parents or sibs. These results do not support the idea that the Kell locus is on chromosome 21. (21 refs.) - *M.T. Lender.*

Department of Medicine
University of Liverpool
Liverpool, England

329 WILSON, MIRIAM G., SCHROEDER, W.A., & GRAVES, DORIS A. Postnatal change of hemoglobins F and A_2 in infants with Down's syndrome (G trisomy). *Pediatrics*, 42(2):349-353, 1968.

A study of 12 newborn infants with Down's syndrome demonstrated that the level of hemoglobin F (HbF) is lower and the level of hemoglobin A_2 (HbA_2) is higher than in normal controls. All the mongoloid infants had 47 chromosomes with G trisomy and with 1 possible exception were normal term. The median distribution of HbF in normal control infants was 84%. Of the mongoloid Ss, 6 were below normal, 3 were at the lower limit and 2 were at the normal HbF median. In normal infants, the median level of HbA_2 was 0.18% and in mongoloid Ss 0.65%. Until 80 days of age, the 2 groups were distinctly different in HbA_2 level and at 5 months, the level in mongoloid Ss was in the upper normal to slightly above normal range. Although the hemoglobin levels of children with many different congenital anomalies have been studied, only those with Down's syndrome show a decreased HbF level and this appears to be an added symptom in the condition. Furthermore, the decrease of the level with age is a more predictable feature. The possibility that subclasses of Down's syndrome exist was suggested by normal HbF and HbA_2 levels in 2 of the Ss. Finally, the current findings are opposite to these in D trisomy, the only other cytogenetic abnormality where hemoglobin changes depart from normal. (10 refs.) - *E. Gaer.*

Los Angeles County
University of Southern California Medical Center
1200 North State Street
Los Angeles, California 90033

330 PHILLIPS, JOHN, HERRING, RUFUS M., GOODMAN, HAROLD O., & KING, J.S., JR. Leucocyte alkaline phosphatase and erythrocyte glucose-6-phosphate dehydrogenase in Down's syndrome. *Journal of Medical Genetics*, 4(4):268-273, 1967.

Assay of leukocyte alkaline phosphatase and erythrocyte glucose-6-phosphate dehydrogenase in mongoloid and non-mongoloid MR controls revealed inter-individual differences to be significantly greater than intra-individual differences. Both enzymes were studied colorimetrically in 28 mongoloids and 28 MRs (non-mongoloid) using 2 blood samples drawn from each S, 1 to 3 weeks apart. Leukocyte alkaline phosphatase was also studied histochemically in 39 mongoloids and 39 MRs (non-mongoloid). It was found that the mean values for both enzymes were higher in mongoloids than in non-mongoloid MRs. The mean erythrocyte glucose-6-phosphate dehydrogenase level was higher in both groups for females than males but was not statistically significant. Furthermore, the values for the 2 groups overlapped in contrast to other studies. Also the alkaline phosphatase values, when studied colorimetrically, were significantly higher in male mongoloids than in MR males, but in females, they were not. Again overlap, not previously reported, was found in these results. Histochemical leukocyte alkaline phosphatase, however, was significantly higher in both sexes in mongoloids. The possibility that trisomic mongoloids could be differentially diagnosed from translocation mongoloids because of the lack of overlapping values was not borne out. Finally, the different values found in the Ss in blood samples taken at different times would indicate that non-genetic factors also influence enzymic activities. (27 refs.) - *E. Gaer.*

Bowman Gray School of Medicine
Winston-Salem, North Carolina 27103

331 McCOY, E.E., ROSTAFINSKY, M.J., & FISHBURN, C. The concentration of serotonin by platelets in Down's syndrome. *Journal of Mental Deficiency Research*, 12(1):18-21, 1968.

Platelet and whole blood serotonin was found to be low in patients with Down's syndrome but platelet binding of serotonin was not significantly lower which suggests that decreased serotonin synthesis accounts for the low values. Serotonin content of whole blood from 14 mongoloids was compared to that of 9 MR and 9 normal Ss, and platelet serotonin content of 11 mongoloids was compared to that of 11 normal Ss. It is theorized that a block of serotonin synthesis exists in mongoloids at the metabolic stage where tryptophan is hydroxylated to 5-hydroxytryptophan (5-HTP) since administration of 5-HTP to mongoloids has been shown previously to increase whole blood serotonin to nearly normal. (9 refs.) - *D. Martin.*

University of Virginia
School of Medicine
Charlottesville, Virginia 22903

332 KOLAR, O., & RUSSELL, D. Serum-proteins in Down's syndrome. *Lancet*, 2(7564):403-404, 1968. (Letter)

The protein band in β-γ-globulin, described as the "X_1"-protein factor, is positively correlated with Down's syndrome and other central nervous system (CNS) diseases. A study of 350 neuropsychiatric Ss revealed abnormal serum and/or cerebrospinal fluid (CSF) immunoglobulin concentrations in over 65%. Two tables illustrating findings relevant to serum-protein and CNS diseases are included and indicate a need for further study which would enable more accurate interpretation of the "X_1"-protein factor in serum and CSF of Down's syndrome patients. (8 refs.) - *J.P. West.*

Department of Neurology and
Division of Neuropathology
Indiana University Medical Center
Indianapolis, Indiana 46202

333 COBURN, STEPHEN P., SIRLIN, EDWARD M., & MERTZ, EDWIN T. Metabolism of N^{15} labeled uric acid in Down's syndrome. *Metabolism: Clinical and Experimental*, 17(6):560-562, 1968.

Two Down's syndrome patients and 2 controls were injected with N^{15} labeled uric acid in order to obtain data on the rate of uric acid synthesis and excretion in Down's syndrome. The Ss were maintained on a low-purine diet for 2 days prior to injection and their urine was collected and assayed for uric acid. The low turnover rates of the Down's syndrome patients (74.6% and 69.3%) show that mongoloids have a total pool of purines of which a large portion is inactive. (5 refs.) - *M.T. Lender.*

Biochemistry Department
Fort Wayne State Hospital and
Training Center
Fort Wayne, Indiana 46805

334 DALLAIRE, LOUIS, & KINGSMILL-FLYNN, DIANA. Auto-immunite de la thyroide et aberrations chromosomiques (Auto-immunity of the thyroid and chromosomal aberrations). *Union Medicale du Canada*, 96(11):1371-1375, 1967.

Seventy-three mothers of mongoloid children and 953 control mothers and male Ss were studied in order to compare the incidence of thyroid autoimmunity. A detailed genetic history of each family and subsequent chromosomal studies were performed on the mongoloids in order to exclude translocation and mosaic individuals. A group of 518 women over 40 years of age were also studied in order to determine the possible existence of a relationship between age and the presence of antithyroid antibodies. Antithyroid antibodies occurred in the control population at the rates of 16% for women and 11% for men; however, 26% of the mothers of mongoloids had these antibodies. Other studies indicated that women over 40 years of age and those with many pregnancies had an increased incidence of antithyroid antibodies. The abnormally high incidence of autoimmunity in the mothers of mongoloids suggests that the condition is related to the potential of producing chromosomal aberrations. (60 refs.) - *M.T. Lender.*

Laboratoire de Genetique Medicale
Hopital Douglas
Montreal 19, Canada

335 DANIELS, DOUGLAS M., & SIMON, JIMMY L. Down's syndrome, hypothyroidism, and diabetes mellitus. *Journal of Pediatrics*, 72(5):697-699, 1968.

A 17-year-old Down's syndrome (trisomy 21) patient was found to have diabetes mellitus and hypothyroidism. Both parents had taken thyroid medication; however, none of the patient's 9 siblings had a history of thyroid problems or MR. The patient's pulse was 60, blood pressure, 98/60; he had 20 respirations/minute and a rectal temperature of 96.40°F. Blood sugar tests revealed an average of 420 mg% and urine tests showed a 4+ urinary sugar with excess acetone. The hypothyroidism was confirmed by a blood protein-bound iodine of 1.5 μg%, a 6% uptake of radioactive iodine, and the presence of bone retardation. (6 refs.) - *M.T. Lender.*

Department of Pediatrics
University of Texas Medical Branch
Galveston, Texas 77550

336 CURTIS, BURR H., BLANK, SAMUEL, & *FISHER, ROBERT L. Atlantoaxial dislocation in Down's syndrome: Report of two patients requiring surgical correction. *Journal of the American Medical Association*, 205(6):464-465, 1968.

Two children with Down's syndrome developed alantoaxial dislocation and subsequently torticollis which was unresponsive to repeated traction. An increased distance between the atlas and the odontoid process in the vertebral column has often been noted in mongoloid Ss and dislocation is a serious threat to the already poor neuromuscular system. In these 2 cases, stabilization was finally achieved by surgical intervention using a halo apparatus to produce cervical arthrodesis. (18 refs.) - *L. Clark.*

*181 East Cedar Street
Newington, Connecticut 06111

337 ANDREN, LARS, & HALL, BERTIL. Increased curvature of the ilium: A new roentgenological sign of mongoloid pelvis. *Developmental Medicine and Child Neurology*, 10(6):781-783, 1968.

Roentgenological studies on 12 mongoloid infants and 20 control Ss indicate that an abnormally large outward curvature of the posterior part of the ilium is characteristic of mongolism. Pelvic radiographs were taken with the infant prone and legs flexed. Six neonate mongoloids had marked curvature while only 1 normal neonate had the same condition. Moderate curvatures were found in 2 mongoloids and 3 normal neonates. The

mean "iliac indices" for the marked, moderate, and slight groups were 60, 75, and 88, respectively; therefore, the iliac index may be a useful tool in the diagnosis of mongolism. (4 refs.) - *M.T. Lender.*

Roentgendiagnostic Department
General Hospital
Malmo, Sweden

338 SLUSHER, M. MADISON, LAIBSON, PETER R., & MULBERGER, ROBERT D. Acute keratoconus in Down's syndrome. *American Journal of Ophthalmology*, 66(6):1137-1143, 1968.

Eight patients (CA 19-36 yrs) with Down's syndrome developed acute corneal hydrops in 10 eyes with keratoconus resulting in edematous, ectatic corneas. All Ss had marked bulbar injection, photophobia, and epiphora and bullous keratopathy developed in 1 S. Medical treatment included pressure patch, sedation, analgesics, topical corticosteroids, acetazolamide (Diamox), and topical antibiotics. Keratoplasty was performed in 5 patients (6 eyes), and repeated twice on 1 eye. Visual acuity in 4 of 5 cooperative patients improved from hand movements at 1 meter to 20/200 and 20/100, from 20/200 to 20/70, and from 20/100 to 20/50. Two Ss now participate in an MR workshop. (15 refs.) - *R.D. Nunn.*

Wills Eye Hospital and Research Institute
Philadelphia, Pennsylvania

339 SCHUB, MARTIN. Corneal opacities in Down's syndrome with thyrotoxicosis. *Archives of Ophthalmology*, 80(5): 618-621, 1968.

A Negro girl (CA 12 yrs) with the rare combination of thyrotoxicosis and Down's syndrome also exhibited exophthalmos and bilateral inferior corneal opacities possibly due to corneal exposure during sleep. In addition to the external stigmata of mongolism, she had multiple cardiac anomalies, an enlarged thyroid gland, punctate cortical lens opacities, dense inferior corneal opacification extending to at least mid-stroma, slight superficial corneal vascularization and patchy superficial corneal staining bilaterally with fluorescein. Poor cooperation exluded accurate visual acuity testing, but she could recognize faces and objects and walk without difficulty. The possibility of an etiological association between the thyrotoxicosis and the ocular disorders in this patient can not be dismissed. (25 refs.) - *R.D. Nunn.*

345 Maple Street
Englewood, New Jersey 07631

340 HOEFNAGEL, D., POMEROY, J., & BENZ, R. Down's syndrome associated with cystinuria. *Journal of Mental Deficiency Research*, 12(4):317-321, 1968.

An MR adult with trisomy-21 and cystinuria also had a cleft palate and cleft lip. Although the karyotypes of the parents were normal, the mother and a brother also had cystinuria, but without stone formation. No scientific data support the association of Down's syndrome with cystinuria. According to the classification of Rosenbury, the Ss belong to Type III heterozygote grouping. Further studies of Ss with cystinuria and trisomy-21 and their families are needed to ascertain the significance of the 4 amino acids which were higher in the patient's urine. Screening for hereditary aminoacidurias among MR and their families is being pursued to delineate the association between aneuploidy and autosomal recessive disorders of metabolism. (15 refs.) - *L.E. Clark.*

Dartmouth Medical School
Hanover, New Hampshire 03755

341 WELCH, J. PHILIP. Down's syndrome and human behavior. *Nature*, 219(5153):506, 1968. (Letter)

To test the hypothesis that Down's syndrome may be the result of delayed fertilization, comparisons could be made of the incidence of the syndrome in similar groups differing only in frequency of coitus, the use of the "safe period" for contraceptive purposes, the use of other forms of contraception, those divorced, and those not divorced. Further investigation might include contraceptive and coital histories in cases where tissue from spontaneously aborted fetuses shows chromosome abnormalities. (18 refs.) - *E.F. MacGregor.*

Department of Paediatrics
Dalhousie University
Halifax, Nova Scotia
Canada

342 LASZLO, J., GYORY, G., & SZILAGYI, G. Gonadal hypoplasia associated with ring chromosomes. *Obstetrics and Gynecology*, 31(2):157-165, 1968.

Two cases of gonadal hypoplasia asssociated with the presence of ring chromosomes in females are reported. Both Ss demonstrated gonadal infantilism, vaginal hypoplasia, amenorrhea, and osteoporosis. The Ss were chromatin-positive with 45 normal and 1 ring chromosome; both demonstrated 46/XX and 45/XO mosacism. This is thought to be the first reported case of ring chromosomes associated with gonadal hypoplasia. (25 refs.) - *K. Drossman.*

Postgraduate Medical School
Budapest, Hungary

343 NAKAGOME, YASUO, SMITH, HUGO D., & SOUKUP, SHIRLEY W. A presumptive Y-autosome translocation in a boy with congenital malformations. *American Journal of Diseases of Children*, 116(2):205-210, 1968.

A boy, 26 months old, with multiple congenital malformations, slow mental development, and peculiar facies had a 47,XY karyotype with an extra submediancentric chromosome probably derived from tne C group. The unusual appearance of this extra chromosome suggests that 2 different chromosomes translocated to each other. The mother of the S had a

normal pregnancy, but had taken "nausea pills" during the first trimester. The S also had a number of dermoglyphic abnormalities suggestive of autosome trisomy syndromes; however, no known syndromes correspond exactly with this particular set of clinical findings. (24 refs.) - *K. Drossman.*

Children's Hospital Research
Foundation
Cincinnati, Ohio 45229

344 HOOFT, C., COETSIER, H., & ORYE, E. Syndrome de Turner et inversion pericentrique probable du chromosome No. 2 [45,X, 2(p+q-)] (Turner syndrome and probable pericentric inversion of chromosome No. 2 [45,X, 2(p+q-)]). *Annales de Genetique*, 11(3):181-183, 1968.

Cytogenetic examination of leukocytes from a female child with clinical signs of Turner's syndrome revealed a 45,X karyotype as well as a pericentric inversion of chromosome number 2. The patient showed no cardiac abnormality (which was observed in the only other reported case of pericentric inversion of chromosome number 2) and the karyotypes of her parents are normal. The possibility of a more complex, but symmetrical, aberration resulting from 2 or more chromosome breaks, rather than pericentric inversion, cannot be eliminated in explaining the abnormal chromosome. (15 refs.) - *M.G. Conant.*

Service de Pediatrie
Rijksuniversiteit Gent
Gent, Belgium

345 DONIACH, DEBORAH, ROITT, I. M., & POLANI, P. E. Thyroid antibodies and sex-chromosome anomalies. *Proceedings of the Royal Society of Medicine*, 61(3):278-280, 1968.

Autoimmune studies on 127 patients with sex-chromosome abnormalities showed some abnormal increments in thyroid antibodies, but normal levels of gastric parietal cell antibody and antinuclear factor, and normal mitochondrial and smooth muscle reactions. The highest incidence of thyroid antibody was found among female patients with ovarian dysgenesis who were mosaics with an XO line and with a structurally abnormal X chromosome. A lower incidence of thyroid antibody was seen in mosaics with XO cells and normal cells, XOs, patients with pure ovarian dysgenesis, and Ullrich's syndrome. Negative findings were noted in males with Klinefelter's syndrome and in 39 parents of patients with ovarian dysgenesis. The interrelationship of the development of thyroid antibodies and the presence of sex-chromosome mosaicism and/or abnormality is a fertile field for speculation, and research might be undertaken in order to delineate the causative factor. (9 refs.) - *E.L. Rowan.*

Rheumatology Research Department
The Middlesex Hospital
Medical School
London, England

346 KAJII, TADASHI, NEU, RICHARD L., & *GARDNER, LYTT I. XY/XYY mosaicism in a prepubertal boy with tall stature, prognathism, and malformations of the hands. *Pediatrics*, 41(5):984-988, 1968.

A 10-year-old boy with mild MR, poor coordination, prognathism, peculiar facies, malformed hands, and abnormal dermatoglyphics is an XY/XYY mosaic with 92% of his cells being XYY. The S has never had any unusual or antisocial behavior, although he has been described as hyperkinetic. He twice suffered convulsions, once at age 3 and again at age 8, from which he recovered uneventfully. Psychological testing revealed deficient visual-motor coordination and poor immediate memory span. EEGs were normal. Since some features are also present in Turner's syndrome an homology among some gene loci on the X and the Y chromosomes is theorized. This case is believed to be the first reported case of XY/XYY mosaicism. (25 refs.) - *K. Drossman.*

*Department of Pediatrics
State University of New York
Syracuse, New York 13210

347 FERRIER, PIERRE E., & FERRIER, SIMONE A. XXYY Klinefelter's syndrome: Case report and a study of the Y chromosomes' DNA replication pattern. *Annales de Genetique*, 11(3):145-151, 1968.

A 17-year-old boy with XXYY Klinefelter's syndrome demonstrated symptoms only slightly different from the XXY syndrome. Studies were made on dermatoglyphs and Y chromosome DNA replication with peripheral blood leukocytes, fibroblasts and DNA labeling methods. The boy (IQ 77) had right gynecomastia and testicular germinal hypoplasia at 16 years of age and a eunuchoid appearance at 17 years of age. Dermatoglyphs showed a low ridge count, a small *atd* angle, primitive loops, and no distal displacement of the axial triradius. The parents had significantly higher ridge counts. Autoradiographic studies revealed that the Y chromosome replication was the same as in normal male cells. (38 refs.) - *M.T. Lender.*

Department of Pediatrics
University of Washington
Seattle, Washington 98105

348 GUSTAVSON, K. -H., ANNELL, ANNA-LISA, KJESSLER, B., & LYTTKENS, G. Chromosomal mosaicism in two emotionally disturbed adolescents with Klinefelter's syndrome (46, XY/47, XXY and 46 XY/47, XYY/48, XXYY). *Acta Psychiatrica Scandinavica*, 44(2):190-201, 1968.

Two male Ss with slight MR, emotional problems, some feminine characteristics, and positive sex chromatin tests were discovered to have Klinefelter's syndrome. One S was a 46XY/47,XXY mosaic and the other was a 46XY/47,XYY/48,XXYY mosaic. The testes of both Ss contained no sperm and the seminiferous tubules were microscopically abnormal. The mother of 1 S died of leukemia, a familial association which has been reported before in the literature and warrants further investigation. Although the mental abnormalities were

present in these patients before puberty, they parallel behavioral characteristics found in other studies on XXY disorders which suggests the possibility of discovering these children early by use of chromatin tests; early treatment may be initiated and mental deviations averted. (22 refs.) - *K. Drossman.*

Department of Child and Youth Psychiatry
University of Uppsala
Uppsala, Sweden

349 GUSTAVSON, K. H., & VERNEHOLT, J. The XYY syndrome in a prepubertal boy. *Hereditas*, 60(1-2):264-266, 1968.

The clinical studies of an 8½-year-old XYY boy revealed that tallness, mild retardation, and psychopathological personality may be symptoms of the XYY syndrome in prepuberty. The boy had difficulties in school, and clumsy fine and coarse motor movements. In addition, he had difficulty in relating to classmates, tired easily, was abnormally sensitive, and lacked initiative. EEG, hormonal, blood, audiogram, opthalmoscopic, neurological, and gross anatomical studies were essentially normal. Physically, he had large, low-set ears and short fifth fingers and although he was tall (149 cm) for his age, his weight was normal for his height. Blood cultures revealed 46 chromosomes plus an extra chromosome resembling a Y chromosome. Family history was negative except for a paternal first cousin who was MR and tall. (15 refs.) - *M.T. Lender.*

Department of Pediatrics
University Hospital
Uppsala, Sweden

350 WIENER, SAUL, & SUTHERLAND, GRANT. A normal XYY man. *Lancet*, 2(7582):1352, 1968. (Letter)

An apparently normal man with the XYY karyotype is characterized by the excessive tallness usually associated with this chromosomal abnormality; however, behavioral abnormalities, criminal tendencies, and MR are lacking. This is at least the second reported case of normal behavior and intelligence in Ss with this karyotype and points-up the fact that much more study needs to be done on the incidence of this genotype in the normal population. (2 refs.) - *K. Drossman.*

Chromosome Laboratory
St. Nicholas Hospital
Melbourne, Australia

351 BORGAONKAR, DIGAMBER S., MURDOCH, J. LAMONT, McKUSICK, VICTOR A., BORKOWF, SHIRLEY P., & MONEY, JOHN W. The YY syndrome. *Lancet*, 2(7565):461, 1968. (Letter)

Two patients with an XYY karyotype are characterized by tallness and behavioral difficulties but not MR, a feature which has been described as a distinguishing characteristic of this chromosomal abnormality. This raises the question of the correlation of MR with this karyotype. (19 refs.) - *K. Drossman.*

The Johns Hopkins University
School of Medicine
Baltimore, Maryland 21205

352 GOODMAN, RICHARD M., MILLER, FRANCES, & NORTH, CAROL. Chromosomes of tall men. *Lancet*, 1(7555):1318, 1968. (Letter)

Chromosomal analysis of peripheral blood from 36 college basketball players (5 Negro, 31 Caucasian; average height 6 ft 4 in) showed no XYY sex-chromosome complement. Although large satellites of the D-group (13-15) chromosomes were found in 20 of the 36 Ss, satellite size may be familial and not associated with any disease. Further study is needed to determine the frequency and influence on behavior of the XYY syndrome. (8 refs.) - *E.F. MacGregor.*

Cytogenetics Laboratory
Department of Medicine
Ohio State University
Columbus, Ohio 43210

353 An extra X chromosome. *Lancet*, 2(7577):1066-1067, 1968 (Editorial)

Surveys conducted in Scotland, Scandinavia, and the United States demonstrate that the incidence of persons with an extra X chromosome in mental hospitals is at least twice as high as expected on chance alone. An extra X chromosome also appears to be correlated with mental subnormality as well as mental illness. Theories advanced to explain this finding include: a hormonal influence, not yet understood; a genetic effect on the brain itself from the extra genetic material on the X chromosome; and a psychological effect, due to the disorder of secondary sex characteristics. Further studies under controlled circumstances appear to be in order. (11 refs.) - *K. Drossman.*

354 TUNTE, W., & NIERMANN, H. Incidence of Klinefelter's syndrome and seasonal variation. *Lancet*, 1(7543):641, 1968. (Letter)

Chromosome analyses and medical histories of 101 chromatin-positive males with XXY Klinefelter phenotypes fail to support the hypothesis that a correlation exists between season of the year and the birth of infants with Klinefelter's syndrome. (4 refs.) - *J. Snodgrass.*

Institute of Human Genetics
University of Munster
Munster, West Germany

MEDICAL ASPECTS—MISCELLANY

355 HILLMAN, J., HAMMOND, J., SOKOLA, J., & REISS, M. Changes in plasma growth hormone levels in retarded children. *Journal of Mental Deficiency Research*, 12(4):294-306, 1968.

Fasting plasma human growth hormone (HGH) levels, as measured by radioimmunoassay, changed in some of 51 EMR boys (CA 9.7 to 15.5 yrs) with subnormal HGH levels who were treated with insulin or human chorionic gonadotropin (HCG). Fifteen of 24 boys showed a positive HGH level response after one injection of insulin, while 6 showed a positive response and 7 some increase in HGH level, 1-2 hours after administration of HCG to 23 boys with an apparent correlation between HCG dose and degree of response. Higher fasting plasma HGH levels and increased linear growth rate were observed in 5 boys treated with the same HCG preparation for 3-4 weeks, while no change occurred in boys receiving placebos. Some degree of mental improvement was observed in patients receiving HCG. (25 refs.) - *M.G. Conant.*

Neuro-Endocrine Research Unit
Willowbrook State School
Staten Island, New York 10314

356 ALTSHULER, KENNETH Z., & BREBBIA, ROBERT. Sleep patterns and EEG recordings in twin idiot savants. *Diseases of the Nervous System*, 29(11):772-774, 1968.

A pair of identical MR twins (IQ 58 and 67 respectively) were examined by EEG and oculograms (EOG) for 3 consecutive nights in order to study their sleep patterns. The twins had strabismus, hyperactive reflexes, poor coordination, but a great ability for calendar calculation. Both had high latency in Stage I rapid eye movement (REM) sleep. The less intelligent twin had normal proportions of REM sleep, above normal amounts of Stages III and IV, and below normal amounts for Stage II. The other twin spent an above normal amount of his sleep in Stage I REM sleep. The difference in REM sleep patterns in these twins indicates that their genetic similarity can be overcome by non-genetic factors. (12 refs.) - *M.T. Lender.*

Research Center
Rockland State Hospital
Orangeburg, New York

357 SMALL, JOYCE G., SHARPLEY, PATRICIA, & SMALL, IVER F. Positive spikes, spike-wave phantoms, and psychomotor variants: A survey of these EEG patterns in psychiatric patients. *Archives of General Psychiatry*, 18(2)232-238, 1968.

The incidence of EEG patterns of positive spikes (18% of children, 23% of adolescents, and 4% of adults), spike-wave phantoms (3.2%), and psychomotor variants (1.4%) in 1,000 consecutive patient referrals was in accord with previously published studies as was their nonsignificant correlation with final psychiatric diagnoses. Overlap of these EEG signals was common, and generalized or multifocal epileptoid patterns were prominent in children with 14/ and 6/second positive spikes, Nearly 2/3 of patients with 6/second spike wave paroxysms or psychomotor variant discharges had other EEG abnormalities. When patients were matched by age, sex, and education with controls with normal EEGs, significant associations were noted with childhood positive spiking and evidence of brain damage, hyperkinesis and epileptoid EEGs. Adolescents with 14/ and 6/second spikes had fewer previous psychiatric hospitalizations and fewer physical illnesses than did controls. The only significant correlate of positive spiking in adults was a greater manifestation of thought disorder on admission. Patients with phantom spike waves had fewer previous psychiatric hospitalizations, later age at onset of symptoms, and fewer suicide attempts than did their controls. No differences were noted between controls and patients with psychomotor variant discharges. Psychiatric interpretation of these signals continues to be tenuous. (8 refs.) - *E.L. Rowan.*

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358 GARVIN, JOHN S. Psychomotor variant pattern. *Diseases of the Nervous System*, 29(5):307-309, 1968.

The psychomotor variant EEG pattern consisting of short runs of 5/ to 6/second notched wave activity over the temporal areas was noted in 38 (0.28%) of 13,442 consecutive patient referrals. Only about 1/4 of the cases had convulsions or "blackouts" indicative of

seizure activity. A high frequency of symptomatic headaches reflects only that an EEG is often ordered as part of a headache work-up and the same coincidental relationship may also apply to those patients with psychiatric diagnoses. The clinical significance of the psychomotor variant pattern remains unknown. (2 refs.) - *E.L. Rowan.*

Department of Neurology and
Neurological Surgery
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Chicago, Illinois 60680

359 ARAGONES, JAIME V. & ERIKSEN, STUART P. Stable chloramphenicol solution for ocular infections. *American Journal of Ophthalmology*, 66(1):104-106, 1968.

A stable chloramphenicol solution, which does not require pharmaceutical reconstitution, is fully potent, needs no refrigeration, which may be stored at room temperature for prolonged periods, and maintain sterility, was effective 42 of 46 cases of ocular infection in Ss from the Lapeer State Home and Training School for MRs. The stable chloramphenicol solution was administered every 4 hours for 3 days then 4 times daily for the next 5 days and was routinely discontinued on the eighth day unless additional therapy was needed. Results were graded with respect to clinical appearance after therapy and culture results. Patients with negative cultures were excluded from the study. One patient died of unrelated causes. Two Ss showed a fair response and 1 of these developed a secondary fungal infection while the other had a recurrent socket infection. One S with *Staphylococcus albus* coagulase-negative conjunctivitis responded poorly. Another with blepharoconjunctivitis became worse and sensitivity studies showed the organism to be resistant to the drug. (7 refs.) - *R.D. Nunn.*

134 West University Drive
Rochester, Michigan 48063

360 GRANT, D.B. Serum-insulin changes following administration of L-leucine to children. *Archives of Disease in Childhood*, 43(227):69-72, 1968.

Serum immunoreactive insulin after an oral dose of L-leucine was determined by a radioimmunoassay method during leucine tolerance tests in 28 children with MR or hypoglycemia. Under the experimental conditions, L-leucine has little effect on serum-insulin in leucine-sensitive children and a significant correlation ($r=0.307$, $p<0.02$) exists between blood sugar and insulin. The 3 Ss with leucine-sensitive hypoglycemia showed insulin increments of 23 to 57 μU/ml with accompanying increases in blood sugar. Measurement of serum-insulin during leucine tolerance tests may help determine if it is a heterogeneous condition. (16 refs.) - *M.G. Conant.*

Institute of Child Health
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England

361 MOLER, E., OLIN, P., & ZETTERSTROM, R. Neutropenia and insufficiency of the exocrine pancreas. Proceedings of the Fifteenth Northern Pediatric Congress (Bergen, Norway, June 28 to July 1, 1967). In: *Acta Paediatrica Scandinavica*, Supplement 177, 29-31, 1967.

Three clinically dissimilar patients (1 MR) who had neutropenia associated with exocrine pancreas insufficiency revealed in the sera the presence of cytotoxic antibodies directed against granulocytes. Lymphocytes and granulocytes were fractionated from the Ss blood and their blood was tested for antibodies capable of lysing nucleated cells. The results were positive for all 3 cases. The fact that granulocytes from some of the parents were affected by the sera of the patients indicates that the disease may be genetically determined. It is possible that the cytotoxic antibody may also affect the exocrine cells of the pancreas. (7 refs.) - *M.T. Lender.*

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Karolinska Institutet
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362 CRAVEN, ELIZABETH MUFFETT. Falsely positive Pregnosticon tests. *Journal of Pediatrics*, 72(1):106-108, 1968.

False positive Pregnosticon tests were obtained in 2 MR girls with amenorrhea. Both 18-year-old girls had had previously regular menstrual cycles until they were examined due to late menses. The first Pregnosticon tests, positive in both cases, were followed by negative tests which were obtained by a 1:1 dilution of urine and water. The positive test in 1 girl may have resulted from thioridazine treatment, which acts to elevate luteotrophic hormone. The other girl began abnormal menstrual period 4 days after the test and increased luteotrophic and luteinizing hormones may have caused her positive test. A 1:1 dilution of urine and water may eliminate a falsely positive test without causing a falsely negative test in most cases. (6 refs.) - *M.T. Lender.*

363 Risk of LSD to mothers and fetuses gauged. *Journal of the American Medical Association*, 204(13):28, 1968.

Mutagenesis caused by lysergic acid diethylamide (LSD) is difficult to determine because of the presence of other potentially mutagenic agents. In a study of 36 LSD-using pregnant women (of whom 30 used marijuana, 24 took amphetamines, 19 drank 1 or more cups of coffee/day, 17 smoked, and 11 took possibly mutagenic prescription drugs), the fetuses in 3 therapeutic abortions showed genetic damage, which suggests LSD-induced changes. Serial blood samples (124) and skin biopsies (44) were taken from the mothers and cord blood samples (23), biopsies (16), and amniotic fluid samples were taken from the newborn. Although LSD causes persistent chromosomal changes in the user, the offspring appear normal in the absence of congenital abnormalities and chromosome aberrations in the infants tend to return to normal after birth. It is thought that continued chromosome breakage (which shortens cellular life) may induce premature aging and could cause premature cancer. (No refs.) - *E.F. MacGregor.*

364 CHOATE, JOHN W., & LUND, CURTIS J. Emergency cesarean section: An analysis of maternal and fetal results in 177 operations. *American Journal of Obstetrics and Gynecology*, 100(5):703-715, 1968.

Analysis of emergency cesarean sections was determined on 177 patients to indicate effective conditions for this service. About 20% of cesarean sections were of emergency type. Primary indications for emergency section were third trimester bleeding, fetal distress, or a combination. Of the total 948 cesarean sections reviewed (771 were not classified as emergencies) none resulted in maternal deaths. Only 2 fetal deaths occurred (not included were those infants who were dead at the time of decision to operate or who weighed less than 1,000 g). Infants having major congenital anomalies not compatible with life were also excluded. Corrected neonatal mortality was 12 infants with 10 of these deaths associated with antepartum hemorrhage. Respiratory complications, deep vein thrombosis, ileus, endometritis, and wound infection were postoperative complications. Postoperative maternal febril morbidity increased in relation to urgency of the situation. The mean decision-delivery (D-D) for the 177 cesarean sections was 12 minutes. Perinatal mortality for this group showed a direct relation to D-D time and doubled if the time exceeded 15 minutes. In cases of abruptio placentae with 33 fetuses alive at time of admission, 30 were discharged alive. Neonatal death rate is high when associated with prematurity. (12 refs.) - *B. Bradley.*

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365 GORBACK, ARTHUR C. Diazepam for eclampsia. *American Journal of Obstetrics and Gynecology*, 102(4):611-614, 1968.

Intravenous diazepam successfully controlled convulsions in a severe case of postpartum eclampsia after other drugs failed. The patient was a 26-year-old primigravida whose pregnancy and delivery were without incident until 2 hours postpartum. For the following 10 hours, the clinical picture underwent progressive deterioration with fulminant hypertension, albuminuria followed by apparent anuria, a state approaching status epilepticus, and deepening coma. Drugs used to reverse the course of events included secobarbital 100 mg, chlorpromazine 25 mg, thiamylal 500 mg, reserpine 3.5 mg (intramuscularly in divided doses), diphenylhydantoin 100 mg, and phenobarbital 130 mg, none of which successfully controlled the seizures. Finally, diazepam (10 mg) was given intravenously with immediate cessation of convulsions; this was required twice more at 4-hour intervals when convulsions recurred and each time the diazepam was effective. Beginning 24 hours postpartum the patient experienced a progressive recovery with complete disappearance of all symptoms, and she has continued to do well during a 4-month follow-up. (No refs.) - *D. Martin.*

No address

DEVELOPMENTAL ASPECTS—PHYSICAL

366 MOHAN, JITENDRA, & MENON, DESH K. Mental retardation and physical persistence. *Indian Journal of Mental Retardation*, 1(2):63-66, 1968.

No significant differences between normals and MRs were found in a study of the relationship between persistence on a physical task and intelligence in 2 groups of Indian school boys. Thirty-two mildly MRs (mean CA 13.7 yrs; mean MA 9 yrs) and 32 normals (mean CA 13.8 yrs; mean MA 12 yrs) were given a test of physical persistence which employed a hand dynamometer. The preferred hand was used to obtain a setting for each S on 3 trials. A measure of persistence was provided by instructing the S to keep the pointer of the dynamometer steady at that point for as long as he could. (18 refs.) - *J.M. Gardner.*

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367 KEOGH, BARBARA K., & KEOGH, JACK F. Pattern walking: A dimension of visuomotor performance. *Exceptional Children*, 34(8):617-618, 1968.

The visuomotor performance of 39 MRs (mean CA 122.6 mos) on Bender-Gestalt and Draw-a-Person (DAP) tests was compared with their reproduction of 4 simple patterns by drawing on paper and walking on unmarked floors. The Koppitiz and Harris scoring systems were employed on Bender-Gestalt and DAP data; the patterns were analyzed on a 1-4 point continuum of poor to good. Results showed that there were more problems with pattern walking than with drawing tasks and that differences between the drawing and walking means were in favor of drawn designs ($p=.05$); however, there were a large number of integration and rotation errors on the Bender-Gestalt Test especially among those who had poor walking scores. Walked patterns were grossly distorted and walking styles were disturbed. MR

children may have disturbance or delay in the integration of body position and movement with visual organization. Difficulty with visuomotor organization was very apparent in an expanded spatial field. (3 refs.) - *B. Bradley.*

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368 CHORUS, A. Types of retarded maturation in mental deficiency: A follow-up study in The Netherlands. In: Richards, B.W., ed. *Proceedings of the First Congress of the International Association for the Scientific Study of Mental Deficiency*, held September 12-20, 1967, Montpellier, France. Surrey, England, Michael Jackson Publishing, 1968, p. 177-181.

The IQs of 275 Dutch adults obtained at age 25-26 years were compared with IQs measured 10 years earlier when they had completed their education at special schools. Increments in IQ points of 10 to more than 30 were recorded for 100 Ss. The IQs of 127 were unchanged, and those of 48 Ss showed decrements of 10 to more than 30 points. Ss with improved IQ scores represent authentic delayed maturation, which is defined as occurring in a previously classified MR child who attains normal or near normal intelligence in adulthood. Delayed maturation of the partially efficient variety, where lack of verbal skills makes the child function as MR, was represented in 21.2% of the group who had IQs below 80 and held high-level or skilled labor jobs. Delayed maturation due either to a poorly stimulating environment in youth or to inhibiting personality factors was not observed in this group. (3 refs.) - *M.G. Conant.*

369 TURKEWITZ, G., MOREAU, T., & BIRCH, H.G. Relation between birth condition and neuro-behavioral organization in the neonate. *Pediatric Research*, 2(4):243-249, 1968.

Neuro-behavioral organization of infants who were considered to be in poor condition at birth (low Apgar ratings) was evaluated during the infants' first week of life. The Ss were divided into 3 groups based upon Apgar ratings assigned 1 minute after birth: high (scores of 9-10), intermediate (scores of 7-8), and low (scores of 1-6). The total sample was composed of 130 infants ranging from 24-81 hours old (mean age 58.7) who were clinically evaluated as in good condition at the time of testing. Testing involved presentation of 30 lateralized somesthetic stimuli to the perioral region of each infant (15/side). Criterion employed was the lateral direction of the first head turn. The results showed that poor condition at birth was not related to an atypical frequency of head-turning response but was related to an atypical lateral difference in responses to stimuli. Infants classified in the high group were more responsive to stimulation of the right side than of the left. This was also characteristic of Ss in the intermediate group. Infants classified in the low group did not demonstrate this pattern and were likely to respond to stimulation at either side. Of the head turning responses, 91% were ipsilateral, however, the proportion of infants in the low group who made contralateral responses was higher than in the other groups. There were no significant sex differences on lateral differentiation for those having similar Apgar ratings. CA did not seem to be an important variable. There was no indication that any particular part of the Apgar rating was a significant factor. (15 refs.) - *B. Bradley.*

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370 MONEY, JOHN. Intellect, brain, and biologic age: Introduction. In: Cheek, Donald B., ed. *Human Growth: Body Composition, Cell Growth, Energy, and Intelligence.* Philadelphia, Pennsylvania, Lea & Febiger, 1968, Chapter 37, p. 535-540.

The rather autonomous course of growth and maturation followed by the central nervous system (CNS), as manifested in intelligence, is independent of the courses of statural growth and various other indices of physiologic age. Exceptions to this principle occur in Klinefelter's syndrome (XXY) in males in which there is an excessive frequency of sluggish puberty and MR; Down's syndrome in which there is a relationship between short stature, late puberty, and MR; cases of dwarfism which evidence short stature and MR; Turner's syndrome which is marked by short stature, agenesis of the gonads, failure of puberty, and a peculiar agnosic form of spaceform blindness. In order to arrive at an understanding of cell growth in the brain and the secrets of mental growth, consideration must be given to the factors involved in the genetic code, inborn errors of metabolism, poisons, autoimmune mechanisms, neurohumoral releasers, critical periods in physical and social development, pheromones, and feedback of social experience on the differentiation of the CNS. The perfection of the principle of biologic age will provide a new and powerful conceptual tool which will allow for a more accurate reflection of growth than the CA concept permits. (15 refs.) - *J. K. Wyatt.*

371 CHEEK, DONALD B., MIGEON, CLAUSE J., & MELLITS, E. DAVID. The concept of biologic age. In: Cheek, Donald B., ed. *Human Growth: Body Composition, Cell Growth, Energy, and Intelligence.* Philadelphia, Pennsylvania, Lea & Febiger, 1968, Chapter 38, p. 541-567.

Biologic or physiologic age is determined by evaluating physiologic, anatomic, biochemical, and mental progress. The application of this concept provides a measure of development and maturation. Sexual maturation is an important aspect of biologic age and full sexual development is defined as the zenith of maturity. This definition means that biologic age can be determined by measuring the distance away from or past sexual maturity. Brain development should be considered separately from somatic development because major mental growth is achieved during the first 5 years of life. Brain development not only occurs earlier than, but also appears to control somatic development and sexual maturity. In order to establish the presence of actual relationship between mental growth and somatic growth, research is needed which will provide correlations between them and

measure those brain hormones directly involved in maturation. Explorations of the relationship between CA and somatic size (and its components), cell number in muscles, and anthropometric measures indicate that integrated data on height, body water, and muscle cell number predict CA in males; and that total body potassium and height predict CA in females. Additional research of this type appears to be a promising means of allowing for the eventual prediction of retardation of growth in abnormal children. (41 refs.) - *J.K. Wyatt.*

372 AGUILAR, MARY JANE, & WILLIAMSON, MALCOLM L. Observations on growth and development of the brain. In: Cheek, Donald B., ed. *Human Growth: Body Compsition, Cell Growth, Energy, and Intelligence.* Philadelphia, Pennsylvania, Lea & Febiger, 1968, Chapter 41, p. 592-605.

Preliminary findings of a longitudinal, multidisciplinary study suggest that there are abnormalities of growth and development in children with congenital heart disease (CHD). Although the mean preoperative IQ of 269 children was within the normal range, there were slight deviations from expected frequencies at the extremes of the distribution. Fewer children were classified as very superior and more children were in the borderline defective and mental defective classifications than in a normal distribution. One-hundred-twenty children evidenced higher error scores than average for their ages on both pre- and postoperative Bender-Gestalt testing. Analysis of the preoperative EEGs of 200 children indicated that 50% had borderline or abnormal records. Postoperative tracings on these children have been consistently normal. Postoperative autopsy examinations of 50 children revealed only 4 cases of chronic neuronal damage and 10 cases of gyral and cytoarchitectonic abnormalities. A comparative and correlative study of brain growth at autopsy in 29 cases of CHD, 29 cases of leukemia, 6 cases of Down's syndrome, and 50 cases without the other specific disorders (non-CHD) indicated that: the correlation between height and brain weight was significantly higher than correlations between brain weight and age, body weight, or kidney weight; male Ss had heavier brains than female Ss; the brains of the CHD Ss were lighter than those of Ss with leukemia or non-CHD; and the brain weights of leukemia Ss and non-CHD Ss were comparable. (42 refs.) - *J.K. Wyatt.*

373 DRASH, PHILIP W., & MONEY, JOHN. Statural and intellectual growth in congenital heart disease, in growth hormone deficiency, and in sibling controls. In: Cheek, Donald B., ed. *Human Growth: Body Composition, Cell Growth, Energy, and Intelligence.* Philadelphia, Pennsylvania, Lea & Febiger, 1968, Chapter 42, p. 606-615.

A comparison of the relationship between statural growth and intellectual growth in 4 subsamples revealed that severe growth retardation is not necessarily accompanied by reduction in intelligence. Ss were 10 preoperative and 20 postoperative children with congenital heart disease associated with growth retardation (mean CA 7.5 yrs; IQ range 60-124), 9 hypopituitary dwarfs (mean CA 12.62 yrs; IQ range 87-149), and 17 siblings of cardiacs and 12 siblings of patients with endocrine disorders (mean CA 10.47 yrs; IQ range 73-131). There was a significant correlation between height and intelligence (.01 level) for unoperated cardiacs and sibling controls, but not for operated cardiacs or hypopituitary dwarfs. Height and intelligence differences between operated and unoperated cardiacs appeared to be due to a sampling artifact and to small sample size. A large percentage of cardiac Ss were from the lower socioeconomic groups, a population in which the majority of people tend to be average in both stature and intelligence. The mean IQ (91.50) of unoperated cardiac Ss was below the WISC mean, whereas the mean IQ (104.80) of operated cardiac Ss was within normal limits. The mean IQ of all cardiac Ss (95.93) was only slightly lower than that of their normal siblings (107.72). Pre- and postoperative tests of 2 cardiac Ss who had open-heart surgery evidenced a marked postoperative loss in performance IQ, but not in verbal IQ. The socioeconomic status of dwarf Ss was weighted in favor of professionals and white collar workers. Although the height of dwarf Ss represented a gross deviation from the norm, their IQs tended to be elevated. The findings of this study confirm the extraordinary autonomy of the growth of the CNS and intelligence and indicate that the discovery of a possible common factor which regulates both physique and intellect will require the study of homogenous groups. (21 refs.) - *J.K. Wyatt.*

374 NODAR, RICHARD H. An investigation of auditory evoked responses of mentally retarded adults during sleep. *Dissertation Abstracts,* 28B(7):3091, 1968.

A comparison of the EEG audiometry of 10 moderately functioning MR adults with that of 5 normal adults suggested that: computer-averaged EEG audiometry may be a feasible procedure for evaluating the hearing level of moderately functioning MR adults; the latency of auditory evoked responses recorded during sleep is not a function of the Ss' intellectual capacity; and the range of latencies reported during sleep can be applied as a criterion value. All Ss were tested in an awake condition with a 1,000 Hz tone at OdB SL, 10dB SL, 30dB SL and 50dB SL. A mild barbiturate was administered to induce sleep and monopolar recordings were monitored to determine stages of sleep. Recorded data were computer-averaged for a 2-second analysis period, plotted, and judged for responsiveness. For the sleep condition, there were few responses at threshold and at 10dB SL and 100% response at 30dB SL. In the awake condition 90% of the MRs responded at 30dB SL. The latencies of the auditory evoked responses of sleeping MR Ss were similar to the latencies of sleeping normal Ss. (No refs.) - *J.K. Wyatt.*

No address

DEVELOPMENTAL ASPECTS—MENTAL

375 HAMPE, RAYMOND A. A developmental study of cognitive equivalence in educable mentally retarded children and adolescents. *Dissertation Abstracts*, 28(B):3471B, 1968.

An investigation of the development of cognitive equivalence in EMR children and adolescents revealed that, although these Ss followed the same patterns in equivalence formation found in normal Ss, they progressed through these patterns at a considerably slower rate. The major difference between MR and non-MR Ss was that MRs employed grouping structures which were consistently less efficient. The 80 MRs Ss represented 4 CA groups, the means of which were 8 years 6 months, 11 years 4 months, 14 years 7 months, and 17 years 5 months. The IQ scores of 1/2 of the Ss were between 48 and 63, the other half had IQs between 64 and 78. The task was to group a series of 9 objects and than a series of 9 words both of which became successively more distant in similarity. Differences between normals and MRs in the development of cognitive equivalence may be due to the MRs' limited ability to generalize. (No refs.) - *J. King.*

No address

376 VAN MEEL, J.M. Cognitieve ontwikkeling bij het debiele kind: I (Cognitive development of the EMR: I). *Tijdschrift Voor Zwakzinnigheid en Zwakzinningenzorg*, 5(4):109-126, 1968.

EMR children show marked differences in rate of growth and complexity of intellectual capacities when compared with normal children of the same CA. Thirty-five children attending schools for the EMR and a control group of 35 normal children were given a battery of tests. The Ss were first asked to divide 41 objects into groups which belonged together and to give reasons for their divisions. At a later time they were taken to another room and asked to name all the objects they remembered. EMR Ss made fewer and larger groups and had more objects which remained ungrouped. The reasons they gave for grouping sometimes did not apply to all objects in that group. On the average, EMR Ss remembered as many objects as the control group, but named them in no particular order. On tests of rigidity of response and perseveration, Wisconsin Card Sorting and a maze test, there were no between-group differences in performance. However, when EMRs were asked to construct a puzzle which was too difficult for their MAs, they remained longer at the task. EMRs had appreciably lower scores than normals on a test of attention and ability to make judgments. (14 refs.) - *S.L. Hammersley.*

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377 VAN OSDOL, WILLIAM R. A comparison of normal and subnormal subjects using visual structured categorization tasks. In: *Special Education: Strategies for Educational Progress: Selected Convention Papers.* (44th Annual CEC Convention, Toronto, Canada, April 17-24, 1966.) Washington, D.C., Council for Exceptional Children, 1966, p. 81-88.

The results of a study of the ways in which conceptual categories are employed by MR and normal Ss suggest that conceptualization errors are not caused by fast or slow response delay time and that correct conceptualization depends on the association and integration of new stimuli into the experiential framework. All Ss (CA range 9 yrs to 11 yrs, 2 mos) represented the lower middle to middle lower socioeconomic level and did not evidence gross physical, hearing, visual, or emotional handicaps. The IQ scores of the 30 boys in the MR group ranged from 54 to 88 (mean 77.96). The scores of the 30 boys in the normal group ranged from 92 to 115 (mean 102.2). Each S completed a modified version of the visual structured categorization tasks constructed by Stephens. Measurements were made of response delay times and total response time. No significant differences were found between MRs and normals on the number of correct responses, on the correlation of correct responses and mean response delay times, or on the correlation of correct responses and total mean task time. MRs did require more total task completion time than normals. Conceptualization categories appear to develop by association of related objects or ideas over a period of time. Repetition may be used to help retain previous learning; however, repetitive drill does not appear to facilitate concept formation. (No refs.) - *J.K. Wyatt.*

378 KEASEY, CAROL T., & CHARLES, DON C. Conservation of substance in normal and mentally retarded children. *Journal of Genetic Psychology*, 111(2):271-279, 1967.

A controlled study of 21 MR children and 21 normal children matched on the basis of MA rather than CA demonstrated that normal children had a better grasp of the concept of conservation of substance even though the MR group had approximately 11.41 years more of life experience. It was concluded that the amount of life experience is not significant in the formation of the concept of conservation of matter and that the capacity to integrate complex neural circuits, a function of the neural development of the child, is the determining factor. It would seem that attempts to hasten concept formation by intensified laboratory experiences will not be fruitful unless the child has reached the level of mental functioning necessary to assimilate

environmental stimulation and to use them to perform logical operations. (13 refs.) - *K. Drossman.*

University of California
Berkeley, California 94721

379 MacKAY, C.K., & MacMILLAN, JANETTE. A comparison of stereognostic recognition in normal children and severely subnormal adults. *British Journal of Psychology*, 59(4):443-447, 1968.

A group of 28 normal children (median CA 5.9 yrs; MA 6 yrs) was compared with a group of 28 severely subnormal adults (median CA 28 yrs; MA 6 yrs) on tasks of tactual discrimination and recognition of both familiar and unfamiliar materials. Both groups achieved higher scores on common object recognition than on recognition of unfamiliar objects (Russian and Greek letters). While normal children did better than the severely MR adults on common object recognition, the severely MR adults were superior in the recognition of unfamiliar objects which they had just felt. A plausible hypothesis is that centers which control the stereognostic discrimination function are not involved in many cerebral insults which otherwise cause severe MR and that this function may be specifically overdeveloped. Verbal coding must be available in order to recall common objects and it is this deficit in the retention, retrieval, and decoding of stored information which characterized the MR. (4 refs.) - *E.L. Rowan.*

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Scotland

380 WILLIAMS, CHARLOTTE L., & BLAKE, KATHRYN A. Type of grouping criterion and retarded, normal, and superior subjects' verbal concept attainment. *Training School Bulletin*, 65(2):40-45, 1968.

Sets of intellectually retarded, normal, and superior Ss equated for MA and CA, respectively, were compared on their use of 2 grouping criteria in verbal concept attainment. One grouping criterion was categorizing object-level words on the basis of first-order concepts; the other, grouping object-level words on the basis of initial letters. MR, normal, and superior Ss did not respond differentially to the 2 types of grouping criteria. On both variants, MR, normal, and superior Ss in the equal-MA comparisons had similar levels of concept attainment. In the equal-CA comparisons, the groups differed; on both variants, the superior group exceeded the normal and retarded groups and the normal group exceeded the retarded group. (19 refs.) - *Edited journal summary.*

University of Georgia
Athens,Georgia

381 STEPHENS, WYATT E., & KOMECHAK, MARILYN. Concept learning in mentally retarded Ss using three types of verbal labels. *Psychonomic Science*, 13(4):231-232, 1968.

An analysis of the differential learning rates of MR Ss on a concept learning task employing noun, verb, or adjective labels revealed that Ss using verb-labels required significantly (.05) more trials for successful task completion than Ss employing noun labels and the performance of Ss employing adjective labels was not significantly different from that of Ss using noun or verb labels. Thirty public school EMR Ss (mean IQ 60.13; mean CA 152.33 mos; mean MA 85.35 mos) were randomly assigned to noun-label, adjective-label, or verb-label groups. The experimental procedure involved the presentation of a series of geometric figures with 7 variations. Ss were instructed to find either a noun, verb, or adjective figure. These data are similar to those evidenced by normal children of similar mental age. (13 refs.) - *B. Bradley.*

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Fort Worth, Texas 76102

382 WHITMAN, MYRON A., & SPRAGUE, ROBERT L. Learning and distractibility in normals and retardates. *Training School Bulletin*, 89-101, 1968.

Discrimination problem performance was ascertained for 2 subject populations matched on MA—normal kindergarten and first grade boys and institutionalized, retarded males. All Ss served in 3 conditions—nondistracting, minimally distracting, and maximally distracting. If retardates are more distractible than normals, a population by distracting condition interaction should have resulted. Although the performance of normal Ss was significantly superior to that of retardates, there was no interaction. The difficulties inherent in making generalizations for groups as heterogenous as "normals" and "retardates" are discussed. (7 refs.) - *Journal abstract.*

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383 LONG, RUBY D. Learning mode preference of educable mentally retarded children. *Dissertation Abstracts*, 29A(1): 151, 1968.

The results of an investigation of the sensory modality preference of 144 EMR public school children (CAs 7-12 yrs; MA ranges 48-58, 69-79) suggest that there is a relationship between intelligence and sensory mode preference. The Learning Methods Test was used to measure the immediate and delayed recall preference of these special class Ss. Although there was no significant modality preference in the immediate test responses of the total group of Ss, the visual method was preferred to the kinesthetic mode in responses to tests administered after a 24-hour period. Ss in the higher intelligence range did not demonstrate a preference on immediate recall and preferred the visual mode to either the kinesthetic or auditory modes on delayed recall. Ss in the low intelligence range did not demonstrate a preference on either immediate or delayed recall. (No refs.) - *J. King.*

384 SCHENCK, HERBERT U., & SHEPHERD, DEE L. Probability learning strategies of the retarded. *California Mental Health Research Digest*, 6(1):8-9, 1968.

In order to better understand complex strategies of choice selection, the behavior of 48 MRs with MAs of 3 to 13.6 years was studied in a 4-choice lever-pressing task with 70% probabilistic reinforcement. Combined visual and auditory reinforcement led to faster learning than visual alone. The rate of learning was a function of MA except for the group with the highest MAs. Maximization led to an inverted U curve, the opposite of the U for normal children. (No refs.) - *J. Snodgrass.*

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385 WILLIAMS, JOANN. Reversal learning in retardates as a function of overlearning and incentive preference value. *Dissertation Abstracts*, 29B(2):799-800, 1968.

An investigation of the relationship between incentive "quality" and the overlearning reversal effect in a visual discrimination task found that reward quality during reversal facilitated reversal learning. Ss were 96 MRs who attended special education classes and had MAs between 4 years 9 months and 9 years 1 month. Ss learned a color-form discrimination task in either a high incentive or low incentive condition. Levels of initial learning were criterion, 50% overlearning, and 200% overlearning. After initial learning Ss were continued on high or low incentive, or switched from high to low or low to high. These findings support a 2-stage mediation theory of learning and suggest that high reward may have served to hold attention to the task for a longer period of time. (No refs.) - *J. King.*

No address

386 GROPPER, ROBERT, & WOODCOCK, RICHARD W. Effects of size and abstractness of picture symbols (rebuses) on visual matching and learning to label. *IMRID (Institute on Mental Retardation and Intellectual Development) Papers and Reports*, 4(16):1-27, 1967.

The variables of size and abstractness of rebus symbols were studied in 2 experiments on visual discrimination and auditory association. The visual discrimination experiment analyzed the relationship between 4 rebus sizes and discriminability, and between 2 levels of abstraction and discriminability. Both the interaction of size and abstraction and its influence on discrimination were also considered. The auditory visual discrimination study examined the relationship between 4 sizes of rebus symbols and the ability to associate them with their aural counterparts, and the relationship between 2 abstract levels and the ability to relate them to their aural counterparts. Ss for both experiments were 20 middle class, non-readers enrolled in the kindergarten class of the Peabody Demonstration School (mean CA 5 yrs 11 mos). Results of the experiments showed that the variable of size was not a significant factor in the number of errors made in visual discrimination or association tasks. However, there was a significant relationship between size and the amount of time spent on a discrimination task. The "regular size" rebus, currently in use in the rebus workbook, was most appropriate. Astractness was a major factor in the association experiment but was not significant in the visual discrimination task. These data do not justify the alteration of the present size of rebus symbols in the reading workbook. Observations indicated that smaller symbols resulted in increased concentration. (14 refs.) - *B. Bradley.*

387 HEAL, LAIRD W., DICKERSON, DONALD J., MANKINEN, RICHARD L., & BRANSKY, MALCOLM L. Solution of simultaneous, matching-to-sample, and successive discrimination problems by retardates. *IMRID (Institute on Mental Retardation and Intellectual Development) Papers and Reports*, 4(10):1-14, 1967.

Three discrimination procedures, matching-to-sample (M), simultaneous (D), and successive (S) discrimination, were compared in 3 related experiments. Ss were sophisticated institutionalized MRs (CA range 14-40; IQ range 28-64). A 3-cue, 2-choice discrimination apparatus with instructions to press the panel (or button) that rang a chime was used. In Experiment I, 1, 2, and 3 cues were present on each trial for conditions S, D, and M, respectively. M proved to be more difficult than S and D which did not differ significantly from each other. Experiments II and III varied cue-response (CR) proximity (close vs distant) and controlled for cue complexity. In Experiment II no significant differences between treatments were found in the distant CR condition. In the close CR condition, D was easier ($p=.01$) than M or S which did not differ significantly from each other. Higher IQ was associated with better performance ($F= 4.28$, $p=.05$). Close and distant CR scores did not differ significantly. Experiment III differed from Experiment II in that partial feedback was provided and the Ss had a higher median IQ (48 as compared to 38). Identical results were found. (9 refs.) - *J.M. Gardner.*

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388 FLAMER, GEORGE B., & KRAL, PAUL A. Paired-associate learning in normal and retarded children as a function of association strength between pairs. *IMRID (Institute on Mental Retardation and Intellectual Development) Papers and Reports*, 4(1):1-15, 1967.

The effects of free association strength (FAS) on the paired-associate learning of MRs and normals were studied to determine whether associations based on normative populations were applicable to MRs. Ss were 45 normal fourth graders (mean CA 9.77), 45 MA matched EMRs (mean CA 14.55; mean MA 9.64), and 45 CA matched EMRs (mean CA 9.56). Ss were randomly assigned to 1 of 3 word lists. Each list contained the same stimuli words but differed in the FAS of the response words: List I contained primary strength, List II intermediary strength, and List III low

strength responses. Each list was divided into high (HSP) or low (LSP) strength pairs. Significant differences between Ss ($F=77.81$, $p=.0005$) and between lists ($F=28.85$, $p=.0005$) were found. List I was easier to learn than Lists II or III which did not differ from each other. Normals were superior to MA matched EMRs who were superior to CA matched EMRs. Data concerning HSP and LSP within each list were inconsistent. Errors of omission were most frequent for all Ss on all lists. Associative hierarchies in normals and MRs were considered equivalent. (8 refs.) - *J.M. Gardner.*

389 STEVENSON, CALVIN R. Study-test of paired-associate learning by retarded and non-retarded children. *Dissertation Abstracts*, 28B(7):3081-3082, 1968.

A comparison of the effects of successive-successive, successive-simultaneous, simultaneous-successive, and simultaneous-simultaneous study-test methods on paired-associate learning revealed significant differences between normal and MR children on acquisition but not 24-hour recall measures of performance. Ss were 40 EMR and 40 normal elementary school-age children. The learning task was based on the acquisition and 24-hour retention of 6 pairs of pictures of common objects. Acquisition measures included trials to learn, number of correct responses, number of omissions, and number of intralist errors. There was no significant test method by intellectual group interaction for any performance measure. Significant effects of test method on performance were found for the intralist error measure under the simultaneous test method. (No refs.) - *J. King.*

No address

390 PREHM, HERBERT J. Rote verbal learning and memory in the retarded. In: Prehm, Herbert J., Hamerlynck, Leo A., & Crosson, James E., eds. *Behavioral Research in Mental Retardation.* Eugene, Oregon, University of Oregon, (Rehabilitation Research and Training Center in Mental Retardation, Monograph No. 1), 1968, p.31-43.

Research on verbal learning has demonstrated a deficiency in learning and retention in MRs. It is clear that performance by retardates on verbal learning tasks is more variable than, and generally inferior to, that of normals. Retardates exhibit both short- and long-term retention deficits and perform significantly worse than normals on tasks involving serial learning, paired-associates learning, and associative clustering. In addition, retardates may have an attention deficit which interacts with the mediational deficit. Learning in retardates can be facilitated by concrete stimuli, longer stimulus exposure times, distributed practice, and overlearning. Some of the methodological problems in studies of verbal learning include sample selection, matching procedures, and the lack of systematic research in given areas. Promising trends include more programmatic research which centers on and isolates the specific components of performance. Developmental studies would contribute greatly to knowledge of verbal learning in retardates. (46 refs.) - *J.M. Gardner.*

391 KEPPEL, GEOFFREY. Comment on rote verbal learning and memory in the retarded. By Prehm, Herbert J. In: Prehm, Herbert J., Hamerlynck, Leo A., & Crosson, James E., eds. *Behavioral Research in Mental Retardation.* Eugene, Oregon, University of Oregon, (Rehabilitation Research Training Center in Mental Retardation, Monograph No. 1), 1968, p. 45-52.

Studies of verbal learning in MRs can profit from methods used in studies of normals. Current work in the study of verbal learning and memory in normals emphasizes component analysis, the breaking down of gross phenomena into their component parts, and has applied it to paired associate learning, transfer of training, and memory. Methodological sophistication, such as, isolating stimulus and response functions, equating degrees of learning before measuring retention, choosing between heterogeneous and homogeneous designs, and distinguishing short- from long-term memory, could also be adopted by MR researchers. While much attention has been paid to the learning processes of MRs, a more functional approach might be to concentrate on transfer of training retention. (41 refs.) - *J.M. Gardner.*

392 ALLEY, GORDON, R., & CARR, DONALD L. Effects of systematic sensory-motor training on sensory-motor, visual perception and concept-formation performance of mentally retarded children. *Perceptual and Motor Skills*, 27(2):451-456, 1968.

This study investigated the effects of an extended, systematic training program of sensory-motor activities on sensory-motor, visual perception, and concept-formation tasks. Ten identical criterion measures were utilized as pretests and posttests in conjunction with a 2-month training program. Both the experimental and control groups' mean scores on all criterion measures reflected improvement from pretest to posttest administrations. However, when the analysis of covariance was applied, no significant differences were evident between the adjusted posttest mean scores of the two groups. (12 refs.) - *Journal abstract.*

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393 SCHOENFELD, LAWRENCE S. The effects of continuous and intermittent auditory stimulation on the performance of brain-injured and familial retardates. *Dissertation Abstracts*, 29B(1):380, 1968.

A study of the effect of extraneous auditory stimulation on the performance of familial and brain-injured MRs revealed no significant differences between brain-injured and familial MRs and no significant performance differences for either group or for both groups combined under 3 levels of auditory stimulation. Brain-injured and familial MRs were matched for CA, IQ, race, and sex. Ss were tested on a simple performance task under continuous auditory stimulation, no auditory stimulation, and varied auditory stimulation conditions. (No refs.) - *J.King.*

No address

394 McGEE, JERRY E. The effects of induced failure and success on the sequential performance of educable mentally retarded children. *Dissertation Abstracts*, 29A(2):414, 1968.

Various patterns of moderate failure interspersed with success and patterns of only success or only failure had a significant effect (.05) on the performance of 45 EMR children (CA range 10 to 13 yrs; IQ bands 50-58, 59-67, 68-75). Patterns of either straight success or straight failure produced significant negative results and patterns of success interspersed with moderate failure produced significantly positive results on the autotelic instrumented manipulanda, a motor performance task. Response to success and failure were significantly different for Ss in each IQ band. The findings of this study support the use of a tract system for the education of the EMR. (No refs.) - *J. King.*

395 WYNE, MARVIN D. Educational and developmental influences on conceptual tempo, delay of gratification, and time concepts of young mentally retarded deprived children. *Dissertation Abstracts*, 28A(10):4013, 1968.

Psycho-socially deprived MR children showed tendencies to increase their performance on measures of reflection and time concepts as CA increased. Ss who had preschool experience had significantly better scores on conceptual tempo and time concept measures than Ss who had not had a formal educational encounter. Ss were 61 socially deprived children whose Stanford-Binet IQs were between 50 and 85. There were 14 experimental preschool Ss and 12 home control Ss (CA 5 yrs), 13 experimental kindergarten Ss and 12 home control Ss (CA 6 yrs), 13 experimental 6 year olds, and 9 experimental 7 year olds. Measuring instruments included the Matching Familiar Figures test, a series of Piaget-like tasks and demonstrations, and a delay of gratification test which employed pennies and balloons. Significant differences found on the delay of gratification measure were scattered and did not indicate an increase in ability to delay gratification with concurrent increase in CA. (No refs.) - *J.King.*

No address

396 GOZALI, JOAV. The need for approval: A motivational study of the performance of mildly mentally retarded young adults in selected performance tasks. *Dissertation Abstracts*, 28A(10):3886-3887, 1968.

An investigation of the effects of positive and non-reinforcement verbal conditions on the selected task performance of 116 mildly MR adults (mean IQ 72; mean CA 20.3 yrs) classified as having either a high or low need for approval revealed (1) significant differences in the task performance of 2 high need for approval groups but not for 2 low need for approval groups, and (2) significant differences in the task performance of high and low need for approval groups. Both IQ and social economic status were poor predictors of need for approval. Experimental groups received positive verbal reinforcement at predetermined intervals; control groups received no reinforcement. The performance tasks were Digit Symbol, Form-Board, and Toss-Penny. The motivational factor appeared to subsume 2 distinct motivational systems in that experimental manipulation could be used to improve or retard the behavior of the high need for approval Ss; however, it had no effect on the behavior of the low need for approval Ss. (No refs.) - *J. King.*

No address

397 LONGFELLOW, LAYNE A. Effects of food deprivation on temporally spaced responding in moderately retarded children. *Dissertation Abstracts*, 288(7):3075-3076, 1968.

Food deprivation was effectively used to motivate bar-pressing behavior in 3 institutionalized non-verbal MRs (CA approximately 8 yrs; IQ range 30-42) over a 30-day period. A differential reinforcement of low rate (DRL) reinforcement schedule was employed with food deprivation levels of 3, 9, 15, and 24 hours. The reinforcer was a special food which provided a balanced diet. Although there were no consistent systematic effects of length of deprivation, each S provided consistent within and between session data which indicated conformity to the DRL contingency. (No refs.) - *J. King.*

No Address

398 ADAMS, ROBERT D. The influence of environmental deprivation on the communication processes of the disadvantaged child in terms of speech and language and their effects on learning and higher mental processes. *Special Education Review*, 23(-):9-29, 1968.

Environmental deprivation and resulting faulty language patterns affect all of the child's language experiences and communication processes. Most of all it results in a retarded learning process and in faulty cognition. Synthesized information from 3 disciplines (psycholinguistics, neurophysiology, and education) provide insight into how deprivation affects the human organism. Constructs based on the role verbal symbolic behavior plays in development form the major concepts of a schema showing that human "verbal symbolic behavior is organismic, ontological, and developmental in nature" and that speech, language, and cognition are integrated central brain processes leading to the highest adaptive processes in man-abstract conceptualization and creative thinking. The main mechanism underlying sensory regulation is the reticular formation. If the organism is subjected to reduced stimuli from birth, the functioning of the reticular formation and development of higher mental process will be adversely affected. This deprivation affects all areas of experience-sensation, perception, imagery, verbal symbolic behavior, and conceptualization. Auditory symbolic development, the development of inner language, is also seriously restricted. Recommendations that should raise the level of academic achievement and school adjustment include begin programing at age 3, place more emphasis on auditory language, utilize findings in linguistics, have smaller classes, develop a diagnostic team within each

school in the inner city, allow each teacher to be more diagnostic and clinical, and provide for the direct involvement of the middle class in the education of the culturally deprived. (32-item bibliog.) - *B. Parker.*

399 BATES, PERCY, JR. The effects of need-affiliation, incentive condition, and type of reward on word learning in retarded children. *Dissertation Abstracts*, 29A(3):809-810, 1968.

Monetary reward proved to have a greater effect on the word learning performance of low need-affiliation EMRs than on the performance of high need-affiliation EMRs. Either group or individual incentive conditions under reward contingencies of money, grades, or control were used to teach a word learning task to 60 EMR children (CA range 13-16 yrs) with high or low need-affiliation motives. Incentive condition did not prove to be related to high or low need-affiliation motives. The reward conditions of grades and control were not significantly related to levels of need-affiliation. (No refs.) - *J. King.*

No address

400 FAY, WARREN, H., & BUTLER, BRUCE V. Echolalia, IQ, and the developmental dichotomy of speech and language systems. *Journal of Speech and Hearing Research*, 11(2):365-371, 1968.

The relationship between childhood echolalia and intelligence was evaluated in a study of the language and speech of 22 echolalic 3-year-olds who produced echolalic responses to at least 10 of 50 speech-evoking stimuli. Characteristics of the sample included a CA range of 35 to 41 months, a mean CA of 35.95 months, 7 females, 15 males, 15 caucasians, and 7 Negroes. The Stanford-Binet Scale (L-M short form) was administered to these Ss at the age of 4 years. IQ scores were then matched with those of control Ss who had the same race and sex codes but had adequate speech examination scores at age 3. All Ss were drawn from a low socioeconomic population. Verbal comprehension, verbal expression, and articulation data were evaluated for all Ss. Results showed that both groups had similar IQs and a similar IQ range. Echolalic Ss evidenced poorer performance on all language tests except those for articulation. Echolalia was differentiated into either pure or mitigated responses. Mitigated echolalia was defined as being "characterized by pronominal reciprocation or by a supplement to a pure echolic segment." Ss classified as mitigated echoers had higher verbal performance scores and a higher mean IQ than Ss with pure echolalia. Data indicate that the audio-motor system is independent from the syntactic semantic system in language development. (25 refs.) - *B. Bradley.*

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401 SLORACH, NEIL. Speech development. *Clearing House Journal*, Issue 8(March):35-41, 1968.

Stages of speech development begin with the pre-speech phases of crying, babbling, vocal play, and echolalia, and progress to the talking stage. The infant uses vocal play to learn about himself and his environment. Feedback from vision, hearing, feeling, and gestures is important to the development of good speech and communication. Speech development requires stimulation, motivation, and acceptance for all children, including the MR. Children need opportunities to see, hear, feel, touch, and smell the things in their environments so that they will acquire meanings for them which can later be communicated to others. Speech therapy programs for MR children must take their individual handicaps into account. MRs need to be able to name things and may require extra stimulation before this ability develops. They need to learn to use "doing things" and action words, and to understand the classifications of similar and different. These abilities precede the development of concept formation and ideas which form the basis of thought processes, and provide a background on which to base communication. (No refs.) - *G. Trakas.*

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402 NIPPER, WILLIAM A. A comparison of certain aspects of categorizing behavior in retarded, normal, and gifted children at two age levels. *Dissertation Abstracts*, 28A(7):2563-2564, 1968.

The findings of a study of the conceptual differentiation and compartmentalization aspects of the picture categorizing behavior of MR, normal, and gifted children revealed that gifted Ss left fewer pictures ungrouped, sorting by triads reduced the number of ungrouped pictures left by normal and MR Ss, older normal Ss tended to form the largest number of groups, MR Ss were less able to explain their groupings, gifted and normal Ss based their groups on more class names and common functional attributes, and only gifted Ss used original abstractions. The 24 stimulus pictures represented objects, animals, persons, and situations common to the environment of school children. One task was to sort the entire set of pictures into groups of things that were alike or belonged together. The other task involved the presentation of the pictures in triads. In this condition Ss were to select the 2 pictures which were more alike or more different, explain the reason for their choice, and select pictures from the remainder of the total set that fitted into the particular group. (No refs.) - *J. King.*

403 DRASH, PHILIP W., GREENBERG, NANCY E., & MONEY, JOHN. Intelligence and personality in four syndromes of dwarfism. In: Cheek, Donald B., ed. *Human Growth: Body Composition, Cell Growth, Energy, and Intelligence.* Philadelphia, Pennsylvania, Lea & Febiger, 1968, Chapter 39, p. 568-581.

A comparison of the intellectual and personality characteristics of 4 dwarfism syndromes—hypopituitary, Turner's, achondroplastic, and deprivation—disclosed

that these characteristics vary greatly from one syndrome to another. Hypopituitary, Turner's syndrome, and achondroplastic Ss were of average intelligence. The majority of the deprivation syndrome Ss were significantly below average in intelligence and were classified either in the borderline category of intelligence or below. No differences in verbal and performance IQs were found for Ss with either hypopituitary or deprivation syndrome dwarfism. Both Turner's syndrome and achondroplastic Ss had higher verbal than performance IQs. Hypopituitary Ss displayed a marked psychomaturational lag, and mild psychopathologic mechanisms of inhibition, dissociation, and neglect or constriction of the cognitive field. Ss with Turner's syndrome evidenced a tendency toward overcompliance, inhibition, constraint, lack of aggressiveness, and femininity, Achondroplastic Ss were characterized by hearty, cheerful, optimistic personalities. Deprivation syndrome Ss displayed significant psychopathologic and bizarre behavior which included overeating and regurgitation, speech retardation, aggressiveness, uncontrollability, and extremely poor school achievement. In the deprivation dwarfism syndrome there appears to be an association between significant deviation below the statural growth norm and significant intellectual and personality deviation. When intellectual and personality characteristics are used as criteria, these 4 dwarfism syndromes become clearly differentiated entities. (17 refs.) - *J.K. Wyatt.*

404 JEDRYSEK, E., ROSENBLATT, J.S., & WORTIS, J. Social class influences on intellectual development. In: Richards, B. W., ed. *Proceedings of the First Congress of the International Association for the Scientific Study of Mental Deficiency*, held September 12-20, 1967, Montpellier, France. Surrey, England, Michael Jackson Publishing, 1968, p. 256-263.

Analysis of the test results of 336 children (CA range 2 to 7 yrs) on the Haeussermann Test of Development Potential indicated that the rate and character of intellectual development in children is strongly influenced by their social class background. Children from the low social class (on the basis of father's occupation, education, and residence) began to fall behind in discrimination, memory, and simple language functions in the second year. By the third year, differences between low and high social classes had become significant. These differences were ascribed to home environment and to opportunities for children from the high social class to attend preschool. Rise in the social class position of Negro families was accompanied by accelerated intellectual development among their children. Test score comparisons of children from different social classes should be made within the same school class for greatest validity. (2 refs.) - *M.G. Conant.*

405 KENNEDY, WALLACE A. A follow-up normative study of Negro intelligence and achievement. *Monographs of the Society for Research in Child Development*, Volume 34, Number 2, Chicago, Illinois, University of Chicago Press, 1969, 40 p.

No significant changes in intelligence over a 5-year period were found for a representative sample of a stratified random sample of 1,800 Negro elementary school children who had originally been tested in 1960. The 312 Ss in this sample were representative of the bottom soicoeconomic level in rural, urban, and metropolitan areas in one Southeastern state. Their mean Stanford-Binet (S-B) IQs were 79.2 in 1960 and 79.4 in 1965. IQs tended to remain constant across grade level. Mean IQ was negatively correlated with age. This appeared to be an artifact of the sampling method which was based on grade rather than age and was not indicative of a trend toward decrease in IQ as a function of age for the individual child. The California Achievement Test data in 1960 and 1965 evidenced a trend for Negro children to fall behind academically and to lose ground gradually as they move upward through the grades. Tenth-grade Ss in 1965 were approximately 3 grades behind the national norms. Occupational status proved to be a good predictor of both S-B and California Achievement Test results. The S-B appeared to be the most powerful single predictor of both the IQ and the achievement variables. The findings of this study suggest that gains made by school systems between 1960 and 1965 have not succeeded in turning the tide of academic deficiency. (29 refs.) - *J.K. Wyatt.*

406 AMES, LOUISE BATES. A low intelligence quotient often not recognized as the chief cause of many learning difficulties. *Journal of Learning Disabilities*, 1(12):735-739, 1968.

Clinical practice observations reveal that one of the most common and obvious causes of poor school performance is low intelligence (between 75 and 90). Children who have not been recognized by their schools as having low intelligence are frequently referred for clinical study because of learning disability. One study of 50 children referred for clinical services because of school problems showed that the IQs of 12 were under 90, and that only 5 had been identified by the school. Children with low intelligence commonly evidence problems of immaturity, personality, and vision. Intelligence tests should be routinely administered whenever a child is spectacularly failing in school. (3 refs.) - *M.L. Wiltshire.*

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407 MICHAL-SMITH, HAROLD. Learning problems of children. *Canada's Mental Health*, 16(6):10-20, 1968.

Blocks to learning come from environmental stress, structure of curriculum, and biological handicaps. The modern approach to learning problems is one of understanding them and making educational changes aimed at reducing stress. Low intelligence is a block to learning and the MR child will never be able to function at the same level as a child of higher intelligence. The clinician must treat an MR in the light of psychological tests, family history, and classroom behavior. The differentiation of a child's learning problems is the clinician's primary diagnostic task. The minimally brain dysfunctioned child has learning problems with reading and arithmetic and does not grasp abstract ideas or transfer learning. The hyperkinetic brain damaged child restlessly darts from one trivial activity to another. The hypokinetic child has a low, almost frozen, response to stimuli. The child with perceptual dysfunction cannot discriminate size, distance, time and part-whole relationships. The child with maturational lag is slow to differentiate, but can reason abstractly. The label brain damaged can compound the primary dysfunction and deprive a child of normal opportunities, stimulation, and ego development. Dyslexia is a basic language disability. Key factors to learning difficulties are auditory, visual, language, movement, concepts and remembering. Detection and treatment should occur at an early age. (No refs.) - *S.L. Markworth.*

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DEVELOPMENTAL ASPECTS—SOCIAL AND EMOTIONAL

408 BARNARD, K.E. L'adolescent arriere (The mentally retarded adolescent). *Deficience Mentale/Mental Retardation*, 17(3-4):17-22, 1967-1968.

A study of 44 MRs (18 girls, 28 boys; CA 13-16; IQ range low normal to SMR) at the University of Washington Adolescent Clinic, Seattle, Washington, investigated the special need of MR adolescents. All Ss received complete physical and psychological examinations. Social workers interviewed the families in order to assess the home situation. Results indicated that guidance, counseling and professional intervention were indicated in the major areas of establishment a significant degree of independence, work training and social behavior, and marriage and family planning. The family doctor can help coordinate the necessary services and aid in keeping the lines of communication between agencies open. After an MR child has been placed in a school program at age 8, families and professionals tend to ignore him. This trend must be reversed so that he can be prepared for adolescence and for successful adaptation to adult life. (2 refs.) - *B. Parker.*

No address

409 SEGAL, ARTHUR. Marriage for the mildly retarded? *Children Limited*, 17(3):5, 1968.

The illusion that MRs are incapable of desiring or assuming successful social relationships should be discarded. Although marriage between mildly MR individuals is not encouraged, the possibility should be acknowledged, and adolescent MRs should be prepared to accept the social responsibilities of adulthood. (No refs.) - *J.P. West.*

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410 EDMONSON, BARBARA, LELAND, HENRY, & LEACH, ETHEL M. Social inference training of retarded adolescents at the pre-vocational level. *Project News* of the Parsons State Hospital and Training Center, 4(7): 10-17, 1968.

To test the theory that the misunderstandings of social situations and inappropriate social behavior evidenced by adult EMRs are a result of interpretative deficit, a 36-item Test of Social Inference (TSI) was developed and social-cue training lessons were taught to 271 EMR

junior high school students. Ss' TSI scores were significantly lower than those of normals. Since remedial education produced widespread gains in TSI scores, social interpretative ability can be learned. Significant gains in social range, social relationships, peer acceptance, attentiveness, and calmness were most marked when the classroom curriculum was supplemented by field work using a "canned" training kit. Further research to determine the effectiveness of this training at a younger age and to provide formal validation of the TSI score as a predictor of the EMR's social success in a job situation is needed. (18 refs.) - *C. Rowan.*

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411 GARDNER, WILLIAM I. Personality characteristics of the mentally retarded: Review and critique. In: Prehm, Herbert J., Hamerlynck, Leo A., & Crosson, James E., eds. *Behavioral Research in Mental Retardation.* Eugene, Oregon, University of Oregon, (Rehabilitation Research and Training Center in Mental Retardation, Monograph No. 1), 1968, p. 53-68.

Research on the personality of the MR is a neglected area. Research problems lie in the continuation of popular stereotypes and misconceptions in the literature and in the inapplicability of traditional personality measures to MR populations because of the limited speech and other deficiencies of MRs. Appropriate MA level items are not controlled for CA and appropriate CA items are generally too difficult. Poor methodological procedures combined with measurement problems make interpretation of those areas where there has been some research (self-concept, anxiety) at best, difficult. In addition, progress in personality research has suffered from too much concentration on institutionalized populations. Two promising examples of work in the area are studies of social deprivation by Zigler and his colleagues and of success and failure as motivational constructs by Cromwell and her colleagues. (50 refs.) - *J.M. Gardner.*

412 CROMWELL, RUE L. Comment on personality characteristics of the mentally retarded: Review and critique by Gardner, William I. In: Prehm, Herbert J., Hamerlynck, Leo A., & Crosson, James E., eds. *Behavioral Research in Mental Retardation.* Eugene, Oregon, University of Oregon, (Rehabilitation Research and Training Center in Mental Retardation, Monograph No. 1), 1968, p. 69-74.

The study of the personality of the MR has received little attention. Personality theory has suffered from a dualistic approach, the use of limited experimental methodologies and inadequate measuring instruments, and attempts to fit it within the framework of numerous different construct systems. If personality is the study of long term recurring behaviors, then fruitful personality research can come from a large number of areas including reinforcement hierarchies and short-term memory deficits. In addition, the relation of early experience to personality (as well as intelligence) should be of significance. At this stage in the research, the study of individual differences and dichotomous groups appears to be most warranted. (2 refs.) - *J.M. Gardner.*

413 WRIGHT, B.A.,& SHONTZ, F.C. Process and tasks in hoping. *Rehabilitation Literature,* 29(11):322-331, 1968.

Interviews were conducted with 10 boys and 4 girls (CA 5-19 yrs), 25 of their parents or guardians, 4 therapists, and 6 teachers to investigate the parents' hopes for their children and to identify the important aspects of hoping. The children's medical diagnoses included cerebral palsy, spina bifida, and achondroplasia. Seven hoping structures, 5 applicable to adults and 2 applicable to children, were identified. Hope structures of adults characteristically included reality surveillance while those of the children did not. The future was a part of the children's reality and played an important role in their hoping processes. Children's hopes appeared to be equivalent to desires. Adult hopes were supported by both desires and reality considerations, but varied according to the manner in which the individual coped with problems of uncertainty regarding hope realizability. Lack of a good reality base was associated with wishful expectation and realistic expectation and with intermittent reality review, postponement of reality review, or concentration on the present. Cognitive-effective tasks involved in the process of hoping are reality surveillance, encouragement, worrying, and mourning. When parents become actively involved in the rehabilitation of the child, the proper balance of these tasks is best effected. (8 refs.) - *B. Parker.*

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414 DeJUNG, JOHN E., & CROSSON, JAMES E. Peer knowledge and subsequent adjustments of the mentally retarded youth. *Project News* of the Parsons State Hospital and Training Center, 4(5):6-12, 1968.

An investigation of the interperson knowledge of 83 institutionalized MR adolescents (CA range 10 to 21; IQ 60s and low 70s) and its relationship to their subsequent social and vocational adjustment revealed that Ss did not have more knowledge of cottagemates with whom they shared considerable assigned activities than of cottagemates with whom they spent little or no assigned activities time and that an MR's earlier knowledge of peers or peer knowledge of or preference for him were not predictors of subsequent vocational and social functioning. The Parsons Sorting Test (PST) was successively administered to each S over a 2-year-period to obtain data on recognition, background, activity preferences, and person preferences of cottagemates. The Home Community Follow-Up Questionnaire was used to obtain follow-up data approximately 2 years after discharge. An "apparency measure", the extent to which each S was known to his peers, was related to PST scores across test administrations; this fact indicates that Ss who were "known about" at 1 testing period or by 1 group were similarly identified at later times or by different groups. Adult cottage aides were only slightly more knowledgeable of the Ss than cottagemates. Low

correlations between social popularity scores derived from the PST and age, IQ, and hospital admission age indicated that these latter factors had a minimal effect on interperson knowledge measures. (2 refs.) - *J. King.*

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415 MENOLASCINO, FRANK J. Emotional disturbances in mentally retarded children. *Archives of General Psychiatry*, 19(4):456-464, 1968.

An evaluation of 256 MR and emotionally disturbed children by a multidisciplinary team showed that psychiatric disorders in MR children were relatively frequent occurrences and differed qualitatively from those noted in non-MR children. One hundred and thirty-four children with chronic brain syndrome (CBS) with behavior reactions, and 43 children with CBS and psychotic reactions showed similar types of emotional disturbances, which were differentiated in degree of emotional disturbance and in the interaction associated with the family. The majority of these children displayed developmental delay intermingled with behavior symptoms. A total approach to the management of these children stressed the treatment of multi-level physical, emotional, educational, social, and family needs on a long range basis. Of 8 children with functional psychosis, 5 had clinical signs of neurological impairment, and 3 were MR and had seizure disturbances with EEG findings of generalized cerebral dysrhythmia. Inpatient management of these children was based on an analysis of etiological facts, identification of the pattern ego disturbances, and provision of specific therapy and tests of reality determinants aimed at improving personality functioning. There were 58 children with adjustment reactions of childhood and 11 in a moderate range of MR whose behavior was associated with delayed intellectual development. Family counseling was the method of treatment used with these groups. (23 refs.) - *F.J. McNulty.*

602 South 44th Avenue
Omaha, Nebraska 68105

416 BRANCALE, RALPH. Emotional disturbance in juveniles. In: Kelly, Elizabeth M., ed. *The New and More Open Outlook for the Mentally Retarded.* Washington, D.C., Catholic University of America Press, 1966, p. 55-69.

Emotional disturbances are caused by genetic, psychological, and social factors, and their interaction. Genetic factors include immaturity, chromosome defects, Rh factor, chemical changes, and radiation. However, most emotional disturbances are acquired and evolve from etiological factors, chronic processes, states of tension, conflicts, psychic mechanisms, and behavioral symptoms with roots in the subconscious. The etiological factors in emotional disturbance are rejection, inferiority, and identity confusion. Disorders may result from social pressures, relate to organic factors, stem from intra-psychic neurotic dynamics, or associate with psychotic states. The treatment of emotional disturbance must include a small setting, supportive attitudes, remedial tutoring, and sometimes, a special class. (No refs.) - *V.G. Votano.*

417 TUCKMAN, JACOB, & REGAN, RICHARD A. Size of family and behavioral problems in children. *Journal of Genetic Psychology*, 111(2):151-160, 1967.

Of 1,581 children referred to outpatient psychiatric clinics, "only" children were underrepresented in the clinic population in relation to the general population. Apparently, "only" children do not have the problems attributed to them; they actually receive better parental care both emotionally and physically. Specific problems were associated with each type of family size; however, the problems are different for each particular size family. Although school problems and antisocial behavior increase with increased sibling number, there is a decrease in anxiety or neurotic symptoms. (21 refs.) - *K. Drossman.*

Philadelphia Department of
Public Health
Philadelphia, Pennsylvania 19104

418 MILLICAN, FRANCES K., LAYMAN, EMMA M., LOURIE, REGINALD S., & TAKAHASHI, LILY Y. Study of an oral fixation: Pica. *Journal of the American Academy of Child Psychiatry*, 7(1):79-107, 1968.

Pica, the persistent ingestion of non-food substances after the age of 18 months, is viewed psychodynamically as an oral fixation or regression. Ninety-five children with pica and 57 comparison (normal and psychiatric) children were evaluated by psychological testing, a psychiatric playroom interview, and parental history. A majority of children with pica were from marginal income Negro families. Findings include a culturally based acceptance of pica, maternal pica, other parental oral habits (alcoholism and drug addiction), maternal fostering of oral defenses against anxiety, separation at an early age from parent or surrogate, lack of maternal warmth for the child, and economic deprivation. In children over 3 years of age, pica was most commonly symptomatic of a more severe disorder (neurosis, psychosis, or organic damage and MR). While younger children benefited from maternal counseling and improvement of dependency relationships, older children required more extensive psychotherapy. Extensive interviews and statistical evaluations may offer some validity to psychoanalytic concepts. (32 refs.) - *E.L. Rowan.*

Childrens' Hospital of the
District of Columbia
Washington, D.C. 20001

419 ORNITZ, EDWARD M., & RITVO, EDWARD R. Perceptual inconstancy in early infantile autism. *Archives of General Psychiatry.*, 18(1):76-98, 1968.

The classical syndromes of infantile autism, pseudoretardation, childhood schizophrenia, atypical development, symbiotic psychosis, and unusual sensitivity represent variations of a single entity with symptoms subgrouped into disturbances of perception, motility, relating, language, and developmental rate. The fundamental disturbance of perception is manifested by heightened awareness, hyperirritability, and

nonresponsiveness to external stimulation. Developmentally, there is a failure to distinguish between self and the outside world, imitate behavior, or modulate perceptual input. This inconstancy of perception is postulated to result from an underlying failure of homeostatic regulation within the central nervous system so that environmental stimuli come in randomly as sensory overload or underload. Such neurophysiological states of excessive excitation or inhibition interfere with the child's capacity to regulate either his sensory input or behavioral output, and result in his disturbed relatedness. (47 refs.) - *E.L. Rowan.*

760 Westwood Place
Los Angeles, California 90024

420 MONEY, JOHN, COHEN, STEPHEN M., LEWIS, VIOLA, & DRASH, PHILIP W. Human figure drawings as index of body image in dwarfism. In: Cheek, Donald B., ed. *Human Growth: Body Composition, Cell Growth, Energy, and Intelligence.* Philadelphia, Pennsylvania, Lea & Febiger, 1968, Chapter 40, p. 582-591.

A comparison of the Draw-A-Person (DAP) figures of 4 female and 25 male juvenile and adolescent hypopituitary dwarfs (IQ range 64 to 149) with those of 370 school children (CA range 6 to 12 yrs) revealed that dwarf Ss deviated from the general population in the caliber of their drawings but not in the frequency with which they depicted their own sex first when requested to draw a person. All DAPs were graded on the Harris norms. Two-thirds of the DAPs of the dwarf Ss scored below the twenty-fifth percentile. Since dwarf Ss did not evidence visual-graphic disabilities in their performance on other psychological tests, their poor performance on the DAP suggests that they possess a perfunctory and negative attitude toward a task that presented a reminder of their statural deficit. Dwarf Ss miniaturized both DAP drawings and both drawings on the Self-and-Friend (SAF) test. The height of their figures on the SAF was below that of the school children. Dwarf Ss appeared to project their body image into their drawings by miniaturizing their figures and by using only a part of the paper provided; however, they were able to depict their own relative shortness in a comparison task. Their accurate representation of their own size discrepancy was so typical that deviations from it may be regarded as a perceptual-graphic sign of misjudgment and possible personality disturbance. (18 refs.) - *J. K. Wyatt.*

DEVELOPMENTAL ASPECTS—PSYCHODIAGNOSTICS

421 AGRAWAL, K.G., & GANDHI, J.S. A comparative study of graphic and verbal scales in the measurement of affective meaning. *Indian Journal of Mental Retardation,* 1(2):75-79, 1968.

The meaningfulness of pictorial versus verbal symbols was studied in a group of 20 institutionalized moderately MR children (IQ range 40-74; mean IQ 54). Eight graphic and 8 verbal 7-point semantic differential scales were constructed for 8 separate concepts: teacher, banana, mummy, pencil, bread, dog, flower, and home. All 16 scales were administered to each S for each concept. No significant differences between mean graphic and mean verbal scale scores were found for the 8 concepts, nor for deviations from the neutral scale point (position 4) for the 2 conditions over the 8 concepts. The hypothesis that MRs have a relatively greater ability to use pictorial rather than verbal symbols was questioned. (2 refs.) - *J. M. Gardner.*

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Chandigarh-18, India

422 RAGLAND, GILBERT. Performance of educable mentally handicapped students of differing reading ability on the ITPA. In: *Special Education: Strategies for Educational Progress—Selected Convention Papers.* (44th Annual CEC Convention, Toronto, Canada, April 17-24, 1966.) Washington, D.C., Council for Exceptional Children, 1966, p. 69-72.

Institutionalized EMR students whose reading level was retarded 1 year or more below the level predicted by their MAs demonstrated significantly inferior performance on the total Illinois Test of Psycholinguistic Abilities (ITPA), the total automatic sequential level of the ITPA, and the auditory vocal automatic subtest of the ITPA than institutionalized EMR students whose reading level was reasonably commensurate with their predicted reading capacity. The mean ITPA performance of both groups was below the theoretical mean for their MAs and was inferior to that of a group of normal readers on all subtests except visual decoding and vocal encoding. All Ss had been assigned to 1 or more educable classes for at least 1 year and had an IQ range of 48 to 79. Performance results on the Gray Oral Reading Paragraphs Tests, the

Metropolitan Achievement Test, and the WISC were used to assign Ss to either the retarded or nonretarded reader groups. The findings of this investigation suggest that: total ITPA score alone is not an effective predictive or diagnostic measure of reading disability in EMRs; essential differences between MR and normal students are in rate, rather than manner of learning; ITPA deficit areas can be identified for retarded readers; and good performance ability on reading achievement tests is more closely associated with abilities measured by the automatic sequential level of the ITPA than with those tapped by the representational level. (6 refs.) - *J.K. Wyatt.*

423 FISHER, GARY. Intellectual impairment in a patient with hepatolenticular degeneration (Wilson's disease). *Journal of Mental Subnormality*, 14(27, Part 2):91-95, 1968.

An analysis of the Wechsler Adult Intelligence Scale (WAIS) performance of a 23-year-old woman with hepatolenticular degeneration revealed a Verbal IQ of 108, a Performance IQ of 94, and a Full-Scale IQ of 102. The 1- and 2-tailed probabilities for a 14-point difference between Verbal and Performance IQs are .075 and .150. The subtest pattern protocol was similar to Wechsler's typical organic test pattern in that the Verbal IQ was higher than the Performance IQ; and Digit Span, Digit Symbol, and Block Design were the lowest scores. Exceptions to Wechsler's organic pattern were observed in that the Picture Arrangement and Object Assembly scores were at the same level as those of the average verbal subtests, while similarities—the subtest considered to be sensitive to organic dysfunction—was the highest subtest score, and there was a discrepancy between the Arithmetic and Digit Span subtest scores. This patient's mental impairment was demonstrated most dramatically on the Digit Span, Picture Completion, Block Design, and Digit Symbol subtests. (10 refs.) - *J. King.*

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Los Angeles, California 90024

424 BERK. T.J.C. An analysis of personality traits in a group of mildly mentally retarded children with a multivariate personality test. *Journal of Mental Subnormality*, 14(2):35-42, 1968.

The similarity of personality structure in mildly MR preadolescent boys was examined using a multivariate questionnaire—the Child Personality Questionnaire. Thirty-three institutionalized retardates (CA 9-12; mean IQ 75) were compared with the American test standardization sample and a group of 81 normal Dutch boys of similar age. Comparisons were made only in cases where the 2 normal samples did not differ significantly. MR Ss were found to be lower in intelligence, have greater mood shifts, and to be more outer-directed than normals. Three profiles emerged which accounted for 60 to 70% of the MR group. Profile I describes a somewhat neurotic child characterized by feelings of loneliness, inadequacy, and remorse. This child is distractible and excitable, has weak superego strength, and often shows anxiety. Profile II is a tender-minded child who is relatively stable, lacks assertiveness, and is dependent. Profile III describes a phlegmatic, inactive child who has mood swings and is outer-directed. All profiles were indicative of lowered intelligence. Despite the low number of Ss, some support for typical personality structures in MRs was found. (14 refs.) - *J.M. Gardner.*

Institute for Child Therapy
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425 BURKE, DONALD A., & SELLIN, DONALD F. Self-concept of ability as a worker: A measurement device for use with EMR adolescents. In: *Selected Convention Papers: 46th Annual International Convention* held April 14-20, 1968, New York, New York. Washington, D.C., Council for Exceptional Children, p. 253-259.

The Worker Scale, a self-concept measure of the vocational competence of EMR adolescents, is designed as an aid to teachers and vocational counselors in determining relevant classroom experiences, possible job placements, and job supervision. It consists of an initial screening interview to determine if the S should take the test, and the investigation of 5 major areas including significant people in the environment and general self-concept as a worker. In addition, the S is asked to indicate how he thinks his parents, teacher, and a friend would rate him as a worker. Internal consistency and test-retest reliability data obtained from 84 EMRs were adequate. A follow-up study of 29 Ss tested during prevocational training revealed that the 4 lowest scoring Ss (worst self-concept) had serious work problems, while the corresponding 4 highest scoring Ss were doing an outstanding job. (15 refs.) - *J.M. Gardner.*

426 GUNZBURG, H.C. The assessment and evaluation of social development in the mentally retarded child. In: Richards, B.W., ed. *Proceedings of the First Congress of the International Association for the Scientific Study of Mental Deficiency*, held September 12-20, 1967, Montpellier, France. Surrey, England, Michael Jackson Publishing, 1968, p. 236-245.

Progress Assessment Charts (PAC) are techniques for the assessment of levels of social competence and for the identification of the socially backward MR child. The PAC Form 1 is used in the education and training of children declared unsuitable for regular school education. These charts are inventories of those skills considered to be important for the MR within his own community. The level of social functioning indicated by the PAC can readily be compared with the norm for retarded persons. Besides identifying deficiencies, these charts make it possible to determine whether there is true backwardness when the age and intelligence of a child are considered. (9 refs.) - *M. G. Conant.*

427 GUNZBURG, H.C. Assessing social competence. *Special Education*, 57(2): 11-14, 1968.

The intelligence test which is designed to assist in academic work with children provides little or no guidance for education in social competence. Since educational programs for the MR are designed to increase social rather than academic competence, an

assessment method to identify pupils who are backward in social competence is needed. Two methods which could be used to identify and evaluate a child's progress in social competence are the Progress Assessment Chart (PAC) and the Progress Evaluation Index (PEI). The PAC Form 1 gives an impression of the quality of social functioning; it is a systematized record form which forces the examiner to observe the child in certain situations, places failure in perspective, and encourages remedial action. The PEI evaluates quantity of social achievement and provides a comparison of the individual child's abilities with the average attainments of children with similar CA and mental handicap. The greatest merit of both the PAC and PEI is that they make the teacher aware of the need for a systematic and directed approach to the social education of MR children. (10 refs.) - *B. Parker.*

Lea Castel Hospital
Kidderminster, England

428 LELAND, HENRY, NIHIRA, KAZUO, FOSTER, RAY, & SHELLHAAS, MAX. The demonstration and measurement of adaptive behavior. In: Richards, B.W., ed. *Proceedings of the First Congress of the International Association for the Scientific Study of Mental Deficiency*, held September 12-20, 1967, Montpellier, France. Surrey, England, Michael Jackson Publishing, 1968. p. 74-80.

The assessment of adaptive behavior—the effectiveness with which one copes with the natural and social demands of the environment—should include the measurement of "impairment of adaptive behavior" as defined in MR. Adaptive behavior is the reversible component of MR and includes the level of independent functioning of the individual, his sense of personal responsibility, and his sense of social and civic responsibility. Measurement of these reversible behaviors provides the basis for curriculum development, including special education, special training, and special treatment. (13 refs.) - *M.G. Conant.*

429 WEINER, BLUMA B. Assessment: Beyond psychometry. In: *Special Education: Strategies for Educational Progress—Selected Convention Papers.* (44th Annual CEC Convention, Toronto, Canada, April 17-24, 1966.) Washington, D.C., Council for Exceptional Children, 1966, p. 89-92.

To extend knowledge of MR children beyond the boundaries of psychometric and educational test scores, systematic observational procedures which can be used directly in the classroom or other life situations need to be developed. Information gained from observational procedures may be used to describe the status of a child more fully, provide bases for developmental decisions, and identify educability dimensions. The dimensions of behavior on which a tentative child observation scheme is based include: level of development or achievement; rate or time required to attain a specific developmental level; range of available learning opportunities and the quality of the responses made to them; efficiency in terms of the accuracy, correctness, economy, and speed of performance with which behavioral adequacy is evidenced; and autonomy in terms of independent, self-actualizing activity. Observational assessments of MR children should define dimensions of behavior to include analyses of reception, perception, differentiation, association, integration and retention abilities; language arts skills; accuracy and stability of auditory, visual, tactile and kinesthetic functioning; and accuracy and dependability of motor, visual motor and vocal coordination. (No refs.) - *J.K. Wyatt.*

TREATMENT AND TRAINING ASPECTS—EDUCATIONAL

430 SMITH, ROBERT M. *Clinical Teaching: Methods of Instruction for the Retarded.* New York, New York, McGraw-Hill, 1968, 292 p. $7.95.

Effective and efficient skill teaching requires the provision of a highly structured and stimulating environment, and clearly identified and properly sequenced components at all levels of special education programs. The clinical teaching method requires that teachers become more sophisticated in testing for, and identifying, the relative strengths and weaknesses of each child. Learning principles which should be understood by all teachers of MRs include: readiness, motivation, immediate feedback, reinforcement of success, exercise, distributed practice, active participation, overlearning, emphasis on accuracy instead of speed, reduction of proactive and retroactive inhibition, minimal change, and the use of strengths to enhance the development of weaker areas. The perceptual sensitivity, selectivity, and stability of an MR child need to be established because perceptual-motor skills form the basis for all subsequent learning. Teaching methods can assist MRs in developing basic perceptual-motor skills by providing training in receptive ability, perceptual-motor association, and/or responding. Since MR children frequently have difficulty developing adequate speech patterns, they may need help in the development of auditory discrimination capabilities, feedback and monitoring systems, and speech mechanisms. Classroom teachers

may increase their effectiveness by using daily lesson plans, homogeneous grouping, data from psychological reports, special services, daily records, and classroom experimentation. This book should be of interest to special education personnel. (221 refs.) - *J.K. Wyatt.*

CONTENTS: Status of Professional Awareness in the Education of the Mentally Retarded; The Nature of Cognitive Development; Assessing Individual Differences; Primary Methodological Concerns; Perceptual-Motor Development: The Foundation for Subsequent Learning; Developing Areas of Communication; Instructing in Reading; Instructing in Arithmetic; Developing Personal and Social Skills; Preparation for Gainful Employment; Adult Education for the Mentally Retarded and Their Parents; and Elements of Organization and Administration.

431 HARING, NORRIS G., & SCHIEFELBUSCH, RICHARD L., eds. *Methods in Special Education.* New York, New York, McGraw-Hill, 1967, 430 p. $7.95.

Evaluation procedures for exceptional children should minimize causation, emphasize the discovery of psychological correlates that influence learning, and lead to effective educational planning and training. Operant methodology can be used in the classroom to provide a reliable means of assessing individual learning processes. Principles derived from studies of learning which can be used by teachers of EMRs include: gaining attention by making tasks attractive and meaningful, providing adequate rewards based on the child's value system, presenting material to be learned in small segments, providing varied reinforcement on an intermittent basis, defining principles so that they can be accurately generalized to other experiences, and using themselves as an external source of stimulation to provide motivation. The goals of training programs for TMRs should recognize the continuous dependent role of TMRs and seek to develop their maximum potential for personal and social adjustment and economic usefulness by emphasizing the formation of acceptable habits. The home, school, and community should provide them with reinforced practical experience training. Goals for TMRs should be defined along a continuum of levels of difficulty to allow for the development of classroom objectives and for individual variations in capabilities and competencies. This comprehensive discussion of modern approaches and educational features developed in both the laboratory and classroom emphasizes the behavior of the exceptional child as a measurable phenomenon on which individual teaching methods should be based. This book should be of interest to educators, special educators, and psychologists. (772 refs.) - *J. K. Wyatt.*

CONTENTS: Operant Methodology and Educational Technology in Special Education (Haring & Lovitt); Language Development and Language Modification (Schiefelbusch); The Educable Mentally Retarded (Cawley & Pappanikou); Research and Educational Practices with Mentally Deficient Children (Goldberg & Rooke); Problems in Educating Emotionally Disturbed Children (Phillips); Children with Specific Learning Disabilities (Petersen); Reading Disability (Cawley); Visually Handicapped Children (Bateman); Hearing Disorders (Frisina); Syndromes of Cerebral Dysfunction: Medical Aspects That Contribute to Special Education Methods (Denhoff & Novack); and Research and Educational Practices with Gifted Children (French).

432 *Special Education: Strategies for Educational Progress—Selected Convention Papers.* (44th Annual CEC Convention, Toronto, Canada, April 17-24, 1966.) Washington, D.C., Council for Exceptional Children, 1966, 259 p. (Price unknown)

These papers were selected from the 1966 Annual Council for Exceptional Children Convention and emphasize educational progress in the areas of the gifted child, MR, communication disorders, behavioral disorders, learning disabilities, visual impairment, preschool programs, administration, teacher education, and the international aspects of special education. Papers on MR deal with language and communication models, research problems, heterogeneity in special education, school work programs, EMR and TMR curriculum, reading, concept formation, assessment, communication needs in the field of MR, and the MR program of the National Institutes of Mental Health. This book should be of interest to educators, special educators, psychologists, and rehabilitation personnel. (188 refs.) - *J.K. Wyatt.*

CONTENTS: Gifted; Mental Retardation; Communication Disorders; Behavioral Disorders; Learning Disabilities; Visual Impairment; Preschool Programs; Administration; Teacher Education; and International Aspects of Special Education.

433 BATEMAN, BARBARA. The application of language and communication models in programs for the trainable retarded. In: *Special Education: Strategies for Educational Progress—Selected Convention Papers.* (44th Annual CEC Convention, Toronto, Canada, April 17-24, 1966.) Washington, D.C., Council for Exceptional Children, 1966, p. 45-49.

Language and communication models may be used in programs for TMRs to: diagnose individual language problems; develop instructional emphases, materials, and techniques; and generate additional research on the nature of the language problems of TMRs. The Illinois Test of Psycholinguistic Abilities (ITPA), a diagnostic test derived from Osgood's model, provides measures of auditory decoding, visual encoding, auditory vocal association, visual motor association, vocal encoding, motor encoding, auditory vocal automatic, auditory vocal sequential, and visual motor sequential. The Parsons Language Sample,a diagnostic test based on a descriptive model, the only assumption of which is that observable language responses are being sampled in various situations, provides measures of all functions measured by the ITPA except visual motor association and auditory vocal automatic. Analyses of the basic language and communication deficits of TMRs imply that teaching methods should provide high intensity levels in task presentation, direct teaching of major dimensions, systematic teaching of verbalizations to accompany the execution of motor behavior, tasks carefully planned to evoke existing concept verbalizations, frequent presentation and systematic overlearning, and increased variability between stimuli as well as simple and continued practice on similar tasks.

Language and communication areas in MR which are still in urgent need of research include: the relationship of sensory processes to each other in language learning and usage; the use of expressive language other than vocal by MRs; the way in which ideas are translated into output; the role of the central nervous system in the linguistic problems of MRs; methods for enhancing linguistic abilities; and the affective aspects of language behavior. (16 refs.) - *J.K. Wyatt.*

434 COTTRELL, RAYMOND S., JR. Ongoing research problems. In: *Special Education: Strategies for Educational Progress—Selected Convention Papers.* (44th Annual CEC Convention, Toronto, Canada, April 17-24, 1966,) Washington, D.C., Council for Exceptional Children, 1966, p. 50-53.

Areas of difficulty in research related to curriculum and/or methodology for MRs lie in the selection of an appropriate dependent variable, precise and/or operational definition of goals, accurate description of treatment programs, selection of a random sample, control of the effects of pretreatment measures, establishment of meaningful control or comparison groups, and use of a statistically appropriate sample size. Problem areas encountered in *A Demonstration-Research Project in Curriculum and Methods of Instruction for Elementary Level MR Children*, an investigation of the use of the inductive teaching method in special classes for MR children, included the selection of teachers to be trained in the inductive teaching method, selection of an untrained comparison group of teachers, description of the "inductive" teaching method, selection of 2 kinds of teacher observation procedures, and training of observers and testers. The effects of pretreatment measures were controlled by administering pretests to ½ of the experimental and control groups. Criterion areas employed in *A Study of the Efficacy of Special Class Training on the Development of MR Children* were intellectual development, academic achievement, and social and personal adjustment. Their measurement proved difficult because of problems related to test validity and availability. Research studies need to consider the concept of statistical power. Careful attention to error possibility will require the use of larger numbers of Ss than are presently used in many studies. (3 refs.) - *J.K. Wyatt.*

435 GOLDSTEIN, HERBERT. Heterogeneity—Implications for research and development. In: *Special Education: Strategies for Educational Progress—Selected Convention Papers.* (44th Annual CEC Convention, Toronto, Canada, April 17-24, 1966.) Washington, D.C., Council for Exceptional Children, 1966, p. 53-56.

The education of the MR has been impeded by heterogeneity in the special classroom, curriculum, and teacher preparation programs. The heterogeneity of special class MRs is greatest in the areas that are important to teaching and learning. The wide variety of developmental phenomena in any given special class make a concentrated, effective, teaching job almost impossible. Although the special class teacher lacks expertise in the area of curriculum, she is usually looking for or helping to develop one. School accepted teaching texts are generally not available. The teacher is usually not in touch with other special class teachers and has no one except a supervisor, whom she may see semiannually or annually, with whom to compare notes. While regular classroom teachers receive 4 years of carefully supervised preparation, the special education teacher generally moves into the special class from a regular class and obtains preparation while on the job. Preparation for special class work which is available to her may involve a 12 to 15 credit state certification program completed in the evenings and/or summer. Practice teaching requirements may be waived or may involve short-term summer supervision in a group teaching setting. When research in learning characteristics allows for the classification of children in accordance with shared learning abilities and/or disabilities, the identification of relevant subject matter and teaching systems can begin, and teacher preparation programs can become less speculative and whimsical. (No refs.) - *J.K. Wyatt.*

436 HUDSON, OLIVER L. Implications for the initiation of work programs in local school districts. In: *Special Education: Strategies for Educational Progress—Selected Convention Papers.* (44th Annual CEC Convention, Toronto, Canada, April 17-24, 1966.) Washington, D.C. Council for Exceptional Children, 1966, p. 56.61.

In initiating a work experience program, a local school district should develop a sound legislative program, carefully select a teacher, and completely involve the facilities and agencies of the school and community. Occupational programs for MRs should include 12 years of school experiences which emphasize the development of communication skills, personality traits, and prevocational skills. Work training opportunities outside the school at the ninth and tenth grade levels should be used to develop attitudes, habits, and understanding needed to obtain and hold a job, and to adjust to life after school. A postschool program should help the slow learner transfer his learning skills to community situations. It should include job placement, further training, follow-up, and counseling programs. Recommended requirements for high school graduation for participants in a work experience program are: satisfactory completion of the special class ninth grade program; a full schedule of classroom instruction during the tenth grade; ½ days in school and ½ days in a supervised work experience during eleventh grade; and full-time work experience supervised by the school during the twelfth grade. The duties of the work experience program coordinator are to inform the community, make decisions pertaining to the instructional areas of the school program, conduct job surveys, facilitate job placement, and make periodic visits to employers. The adequate performance of these duties requires much time and ability. A growing program requires a full time coordinator. (No refs.) *J.K. Wyatt.*

437 NIESEN, NORMAN J. How to organize for the development of an effective curriculum for the educable mentally retarded. In: *Special Education:Strategies for Educational Progress—Selected Convention Papers.* (44th Annual CEC Convention, Toronto, Canada, April 17-24, 1966.) Washington, D.C., Council for Exceptional Children, 1966, p. 65-69.

Basic principles which should guide curriculum development projects for EMRs include: the involvement of teachers, supervisors,and administrators; the realization that curriculum development is an ongoing process which takes time, effort, interest, research, and hard work; an understanding by participants of the meaning of curriculum; the development of long range goals; a thorough understanding of the growth, development and learning patterns of handicapped children; and a belief in the inherent worth of each child. Factors which should influence the selection of curriculum content are: the learner's nature and needs; the demands of society; the purpose, meaning, and utility for the learner; and the scope and sequence. Curriculum development may be facilitated if the experience of participants is utilized fully, and leadership, direction, articulation, and coordination are provided. (2 refs.) - *J.K. Wyatt.*

438 SPICKER, HOWARD H., HODGES, WALTER L., & McCANDLESS, BOYD R. A diagnostically based curriculum for psychosocially deprived preschool mentally retarded children: Interim report. In:*Special Education: Strategies for Educational Progress—Selected Convention Papers.* (44th Annual CEC Convention, Toronto, Canada, April 17-24, 1966.) Washington, D.C., Council for Exceptional Children, 1966, p. 75-81.

A comparison of the test performance of 4 groups of preschool aged children from economically and psychosocially deprived home environments revealed that the group who had attended an experimental preschool at Indiana University for 1 year had a mean post-test Stanford Binet (S-B) score which was reliably greater than that of 2 home control groups, but not significantly different from that of a group attending a regular kindergarten class. Pretest S-B scores of all Ss were between 50 and 85. Pretest between-group differences were not significant. Ss in the home control groups participated in the testing but did not attend school. The experimental preschool group evidenced significantly greater post-test gains on the Peabody Picture Vocabulary Test (PPVT) than the other 3 groups. Their greatest PPVT improvement occurred in the action words with which they had experienced pretest difficulty. Performance on the Illinois Test of Psycholinguistic Abilities indicated that all Ss gained in their mean total language over the year, each group maintained its own rate of acceleration, and the experimental preschool group evidenced significantly greater differences between pre- and post-test scores than did the other groups. The activities of the experimental preschool curriculum emphasized the elicitation and reinforcement of elaborative language, the improvement of physical self concept, and the use of compensatory educational concepts to correct diagnosed educational problems. (3 refs.) - *J.K. Wyatt.*

439 WOLINSKY, GLORIA F. Curriculum considerations in programs for the trainable retarded: Application of theoretical models. In: *Special Education:Strategies for Educational Progress—Selected Convention Papers.* (44th Annual CEC Convention, Toronto, Canada, April 17-24, 1966.) Washington, D.C., Council for Exceptional Children, 1966, p. 93-98.

Piaget's developmental approach to human behavior may be utilized as a basis for curriculum planning for TMR children. Guides for understanding the curriculum needs of multihandicapped TMRs may be found in the sensory-motor and preoperational periods. The dialogue between examiner and child which Piaget utilized to understand a child's level of comprehension may be employed in curriculum planning to identify weak, unlearned, or poorly comprehended concepts. Although many TMRs must learn things without a true understanding of their meaning, it is important to be able to differentiate between those facts which are merely learned and those which are both learned and understood. The theories of Piaget provide a functional inventory of experiences that will mesh with the individual child's activity level. To identify the performance and strategy needs of the individual child and the path which should be followed to arrive at a developmental goal, basic developmental processes and their application in terms of growth, development, and plateau should be considered. Piaget's hierarchical system of thought processes, rules of thought, and concern with development may provide the understanding of cognitive development prerequisite to the application of the information uncovered by learning experiments. Teachers need to understand TMR development in terms of tasks and processes and to devise materials and approaches which interrelate with the specific developmental aspects of the individual child. (8 refs.) - *J.K. Wyatt.*

440 LOOMIS, CHESTER. Translating research findings into classroom action. In: *Selected Convention Papers: 46th Annual International Convention*, held in New York, New York, April 14-20, 1968. Washington, D.C., Council for Exceptional Children, p. 233-241.

MRs manifest major learning problems of poor recall, distractibility, and deficient conceptual or abstracting abilities. Research on MR learning suggests strategies for dealing with these problems. To facilitate recall, material should be simplified and MRs should be given opportunities for continued, distributed, and varied practice. Overlearning (learning a task beyond criteria) aids recall and can be of significant value. Poor attention can be dealt with by reducing irrelevant and maximizing relevant cues and by avoiding attentional shifts. The teacher should avoid failure sets, reinforce attending behavior, and move from easy to hard tasks. Limited conceptual ability can be compensated for by developing relevant concepts (size, shape, matching) and by verbalizing solutions to problems. Classroom procedures for the MR should be different from those for normals since strategies used to gain and keep the attention of MRs would be boring to normals. Special education can be "special" when empirical results of learning studies are applied to the classroom. (20 refs.) - *J.M. Gardner.*

441 PEERY, EVERETT D. A comprehensive evaluation, therapy and academic training program for handicapped children in a sparsely populated state. In: *Selected Convention Papers: 46th Annual International Convention*, held in New York, New York, April 14-20, 1968. Washington, D.C., Council for Exceptional Children, p. 203-205.

In the last few years there has been a rapid growth of programs for handicapped children in Montana. Currently the school system has 92 EMR and 7 TMR classes in addition to 5 classes for the physically handicapped, and 1 class for hard-of-hearing children. Speech therapy is provided in 10 school districts and through a mobile speech program and various speech centers. There is 1 state institution for the MR and 1 for the deaf and blind. At the Montana Center for Handicapped Children an interdisciplinary team approach is directed toward major areas of concern which include: a special education program from preschool through the eighth grade; a medical, cleft palate, and speech clinic; an MR evaluation clinic; and a training program for student teachers, student nurses, and paramedical therapists. Great effort is made to provide information to parents concerning the various programs. Future clinics are planned which will focus on educational and vocational programing, and the diagnosis of neurological impairment. (No refs.) - *J.M. Gardner.*

442 ABESON, ALAN. The design process in special education facility planning. In: *Selected Convention Papers: 46th Annual International Convention*, held New York, New York, April 14-20, 1968. Washington, D.C., Council for Exceptional Children, p. 131-133.

The structure of the environment is important to effective programing in special education. Habilitative environments can be fostered through "design process"—the design and implementation of a facility based on a functional analysis of the behaviors which should occur in that environment. To implement design process, both teacher and architect must work together, and with ancillary and support personnel. Obstacles to design process include the different communication styles of the various professions (graphic versus verbal), the time limitation of both educational and architectural specialists, and the existence of areas in which neither architects nor educators are expert. Time limitations can be overcome through careful advanced planning and effective committee organization. Careful planning, individual analysis of program goals, cooperation between architectural and educational personnel, and consultation with outside specialists can produce meaningful learning environments. (2 refs.) - *J.M. Gardner.*

443 LILL, MARJORY L. Group teaching of trainable retarded children. In: Kokaska, Charles J., ed. *Selected Speeches from a Workshop for Aides to Teachers of the Trainable Mentally Retarded.* Lansing, Michigan, Department of Education, 1969, p. 3-9.

Important teacher guidelines necessary for teaching any subject or task to TMR children include: know each child; provide a pleasant learning experience; adopt an enthusiastic attitude; use simple, step-by-step teaching methods; allot ample time for each task; be firm and consistent; provide realistic motivation at each child's level; provide encouragement and praise for real effort; and be flexible. Although many formal tests may be used to evaluate a child and identify his needs, teacher observation is the best evaluation and need identification method. Types of group teaching methods which may be used with TMRs are the unit method, the project, and specific skill teaching. All school activities should involve carefully planned and highly structured training of immediate significance in effecting behavior change (No refs.) - *J.K. Wyatt.*

444 TOSQUELLES, FRANCOIS. *Structure et Reeducation Therapeutique (Aspects pratiques)* (Structure and therapeutic reeducation [Practical aspects]). Paris, France, Editions Universitaires, 1967, 126 p. (Price unknown)

Theoretical problems with practical significance in the therapeutic reeducation of the MR are discussed with emphasis on the pedagogical problem, the psychoanalytic aspect, and the institutional organization aspect. The notion of structure in the perception of a situation is discussed in detail, especially with regard to Levi-Strauss' philosophy of language, which consists of signs, symbols, and social rites. The importance of language, of recognizing when basic concepts are missing, of differentiating between the concrete and the imaginary, and of perceiving one's self as an individual are emphasized. The psychoanalytic research of Lacan is of value in therapeutic reeducation. Educational and therapeutic institutions would function most effectively if they were modeled on true human nature and not on the false evidence of "general" psychology. This book would be of interest to psychologists and educators. (85 refs.) - *M.G. Conant.*

CONTENTS: The Notion of Structure; Signal-Sign and Symbol; Symbol-Value-Exchanges; The Imagination and the Mirror Stage; Symbolism and Imagination; and Structuralism and Educational and Therapeutic Institutions.

445 DE PELLEGRINI, LUDWIG. Lehrprogramme fur Sonderchulen fur Lernbehinderte und die Vorbereitung auf den Programmierten Unterricht (Instruction programs for special schools for slow learners and preparation for programed instruction). *Zeitschrift fur Heilpaedagogik*, 18(9):491-496, 1967.

Small step programed instruction can be adapted to special schools for the MR to rationalize individual instruction and lead to algorithmic and stochaic processes. Difficulties in programed instruction for MRs include lack of knowledge regarding didactic theory and lack of actual learning materials. One successful program prepared MRs for programed instruction by using a method which involved the step-by-step direct dictation of 1 sentence by either the instructor or a tape recorder. (4 refs.; 8-item bibliog.) - *S.P. Glinsky, Jr.*

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7858 Weil am Rhein
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446 SIEGEL, ERNEST. ***Special Education in the Regular Classroom.*** New York, New York, John Day, 1969, 171 p. $5.50.

Since marginally exceptional children who may be MR, brain-injured, or emotionally disturbed are often enrolled in regular classrooms, teachers must be aware of their special problems. Trained teachers can help these children to deal with problems of poor self-concept, anxiety, attention, organization, writing, abstract thinking, coordination, immaturity, and behavior. The teacher's work also includes lesson planning, in-service training, and cooperation with parents. School administrators should establish special education programs and provide support for both the teacher and the child. Teacher-training institutions should emphasize learning problems, child growth and development, the effects of social and cultural factors, and the services of community agencies. The practical teaching tools, teaching methods and modifications, and theoretical background in this book should be of interest to school administrators, regular classroom teachers, special classroom teachers, and parents of exceptional children. (151 refs.) - ***V.G. Votano.***

CONTENTS: The Exceptional Child; The Teacher's Role: Techniques for Solving Nine Basic Problems; Additional Aspects of the Teacher's Role; The Role of the School Administrator; and the Role of Teacher-Training Institutions.

447 TIZARD, J. ***Survey and Experiment in Special Education.*** London, England, George G. Harrap, 1967, 36 p. $0.42.

Research findings on educationally subnormal (EMR; IQ above 50) and severely subnormal (SMR; IQ below 50) institutionalized adults and children in England revealed that principles of child care, education, and social work developed for use with normal children can be modified to meet the needs of the subnormal. EMR adults were trained to perform economically useful and socially meaningful tasks, placed in work outside the hospital, and subsequently discharged from the hospital. SMR adults were taught to persevere at unattractive tasks for long periods of time and to perform routine industrial tasks in a sheltered environment (even those with IQs below 25). Their performance was markedly better when encouragement was provided. A comparison of 250 SMR children living at home and in institutions revealed that institutionalized Ss were greatly retarded intellectually and emotionally, especially in language and verbal intelligence, and that retardation increased with age. A 2-year experimental program in which 16 TMR children lived in a large private home and participated in an educational program designed to meet their special needs demonstrated the effects of a traditional institutional environment on development. Ss made good their language deficiencies and evidenced remarkable social and emotional development when compared with a matched institutionalized control group. An investigation of the social structure of 4 institutions disclosed that ideology and administrative structure, rather than residents' handicaps or staff training, outlook, or personal qualities,were responsible for striking differences in patterns of child management. Authoritarian institutions employed institution-centered child management practices, and institutions with decentralized authority employed child-centered child management practices. (21 refs.) - ***J.K. Wyatt.***

448 COTTON, ESTER, & PARNWELL, MARGARET. Conductive education: With special reference to severe athetoids in a non-residential centre. ***Journal of Mental Subnormality***, 14(2):50-56, 1968.

Conductive education is based on a unified approach to the teaching of normal movement patterns, functional skills, and speech to cerebral palsied (CP) children. Children with like disabilities and levels of achievement are grouped and receive instruction from 1 therapist—a conductor. The conductor is a high school graduate who has received 4 years of training at the State Institute for the Motor Disabled (Budapest, Hungary) and at a teacher training college. Conductive education emphasizes rigid routine, a distraction-free environment, and instruction by 1 teacher (rather than by several therapists). The program aims at providing the child with a sense of security and order, emotional and social development, and the ability to accomplish specified tasks. Program design includes the immediate reinforcement of improvements by the conductor. The original program was designed to cover 12 hours/day, 5 days/week. However, a modified system covering 6 hours/day, 5 days/week has been successfully used with severe athetoid CPs (CA 3-12 yrs) at the Lady Zia Wernher Centre (Luton, Bedfordshire). (No refs.) - ***C. Rowan.***

Lady Zia Wernher Centre
Luton, Bedfordshire, England

449 GOLDBERG, I.I. Comparative special education for the mentally retarded. In: Richards, B.W., ed. ***Proceedings of the First Congress of the International Association for the Scientific Study of Mental Deficiency***, held September 12-20, 1967, Montpellier, France. Surrey, England, Michael Jackson Publishing, 1968, p. 147-154.

The field of comparative special education for the MR deals with the comparison of current theory and practice in the education of children considered MR in their own countries, cultures, and localities, and should provide a broader and deeper understanding of the problems involved in the education of the MR. Interest in the study of educational facilities for handicapped children in foreign countries during the last 10 years indicates that special educators are aware of the contribution their field can make. Before the field of comparative special education can become well established, criteria against which 2 or more countries can be compared must be developed. (15 refs.) - ***M.G. Conant.***

450 GOLDSTEIN, HERBERT. Fostering independent, creative thinking in educable mentally retarded children. In: Kelly, Elizabeth M., ed. ***The New and More Open Outlook for the Mentally Retarded.*** Washington, D.C., Catholic University of America Press, 1966, p. 17-29.

A curriculum-guide which includes social or life functions, subject matter, and a teaching method which takes teacher-pupil interactions into account is a most important remedy for deficiencies in social learning present in special class programs. Social or life functions consist of citizenship, communication, home and

family, leisure time, money and materials management, occupational adequacy, health, safety, social adjustment, and travel. The teaching method stresses problem solving and the development of inductive reasoning. A model of a teaching method based on principles of learning can be used by special class teachers to provide them with consistent organization, management, and learning evaluation approaches. The teacher's goal should be to help the child make relevant associations and block distracting stimuli, provide appropriate reinforcement, and re-evaluate incorrect responses in ways that enhance the self-concept and build mediating behavior. (1 ref.) - *V.G. Votano.*

451 SEATON, KIRK. Influence of changes in education on the mentally retarded and the resultant social expectancies. In: Kelly, Elizabeth M., ed. ***The New and More Open Outlook for the Mentally Retarded.*** Washington, D.C., Catholic University of America Press, 1966, p. 30-44.

Trends in national thinking about education which have affected the education of, and social expectancies for, MRs include broadened hopes for the effectiveness of education caused by recent evidence that intelligence is much less fixed than was formerly believed, and interest in classroom atmosphere and group methods which has evolved from research on the effects of environment on personality and adjustment. In mental health terms, a child's educational experiences can be prophylactic or therapeutic. A prophylactic classroom provides a natural setting in which feelings of inner worth are fostered. A non-prophylactic classroom is characterized by feelings of failure and inadequacy in that the child cannot attain the level of academic accomplishment required for success. The therapeutic classroom provides the qualities of the prophylactic classroom plus a therapeutic concentration on behavior, feelings, and self, and a continual process of self-confrontation. In a completely unstructured classroom the teacher holds free discussion and allows the children to discuss anything they choose. Teaching methods found effective with lower and middle elementary grades may be effective with EMRs. The role play or sociodrama method may be particularly appropriate for EMRs. It not only requires the children to put themselves in very different roles with appropriate feelings and concerns, but also provides teachers with deeper insight into student's concepts and modes of interpersonal relationship. (1 ref.) - *V.G. Votano.*

452 MILLER, ROZELLE. Innovation in curriculum development for the mentally retarded. In: Kelly, Elizabeth M., ed. ***The New and More Open Outlook for the Mentally Retarded.*** Washington, D.C., Catholic University of America Press, 1966, p. 45-54.

Curriculum for the MR should train children to adapt to society and incorporate social change into their futures. Learning requires readiness, motivation, performance, and application. Present guides do not take behavioral differences, a unifying theory, nor considerations of social adequacy into account. The assessment of a child must be done by parents, doctors, psychologists, and teachers. (No refs.) - *V.G. Votano.*

453 BARNET, KUHN. The administration of a school program for the mentally retarded. In: Kelly, Elizabeth M., ed. ***The New and More Open Outlook for the Mentally Retarded.*** Washington, D.C., Catholic University of America Press, 1966, p. 70-80.

School programs for the MR are administered by the state director, state supervisors and specialists, and local administrators and supervisors. The state director's duties include budget and guidelines preparation, assembling a state staff, and working with colleges. The state supervisor is responsible for preparing curriculum guides, organizing classes, selecting equipment, designing classrooms, and scheduling classes. Local administrators must develop efficient school programs and be concerned with financing and program organization. (No refs.) - *V.G. Votano.*

454 McGETTIGAN, JAMES F. In: ***The Elementary Principal Meets the Exceptional Child.*** Cleveland, Ohio, Case Western Reserve University, 1968, p. 9-13.

Since the majority of slow learners continue to receive their educations in public schools, the processes of labeling and placement used in their identification are important. Identification as MR and the action taken as a result affect the personality of the child. Slow learning children should receive direct and indirect counseling from the teacher, and should be convinced through the good treatment they receive that they count as individuals and can learn to do school tasks. When special class school work is tailored for slow learners, they can learn to do it. Slow learners in regular classes usually find the work too difficult for them and find reasons to do other things. They are often disliked by other children because they become bullies; disrupt learning activities; and are slow in grooming, hygiene, and learning rules for games. Special classes should have the same status and special services as regular classes. These include music, art, physical education, library services, and science. References to the special class, room, and teacher should be identical to those used in regular classes. The observation of these procedures will facilitate the integration of the special class and its teacher into the school building and its programs. (No refs.) - *B. Parker.*

455 HARRIS, GAIL A. Trainable pupil management. In: Kokaska, Charles J., ed. ***Selected Speeches from a Workshop for Aides to Teachers of the Trainable Mentally Retarded.*** Lansing, Michigan, Department of Education, 1969, p. 10-15.

Pupil management is the provision of structure for the control of an individual which, for a TMR pupil, usually begins with the provision by a teacher of firm, consistent external control designed to enhance the development of internal control. External pupil management requires the organization of materials and activities before students enter a class, and the provision of constructive program suggestions, consistent classroom rules and structure, instruction aimed at the individual child's level of language development,

frequent praise, frequently changing activities, a quiet corner, and concrete materials. Teachers should be prepared to take immediate action if a fight occurs, avoid the use of fear tactics, and retain a sense of humor. (No refs.) - *J.K. Wyatt.*

456 HAMMAN, JOHN. Classroom control. *Pointer*, 24-25, 1968.

Teachers can attain and maintain control of a class and eliminate or lessen the emotional distress of MR students by anticipating, understanding, and utilizing non-verbal actions such as gestures, expressions, actions, and movements. Suggested prompt action which teachers may use to help the MR student avoid an emotional crisis include: having the student perform a task which will remove him from the room, providing reassurance aimed at preventing an outburst, or dividing the responsibility for a crisis between the teacher and student. (No refs.) - *V.R. Shaffer.*

Special Education Division
Indianapolis Public Schools
Indianapolis, Indiana 46200

457 DIERLAMM, THEODOR Geistigbehindertenschule (School for mentally retarded). *Zeitschrift fur Heilpadagogik*, 18(3): 156-159, 1967.

Special schools for the MR, the newest type of public school in the German Federal Republic, can profit from the experiences of already existing private and charitable special schools. MR children can develop potential skills if incorporated into a schooling program as early as possible. Early schooling depends upon early identification during the first inoculations, kindergarten registration, and grade school testing. School attendance by MR children is now obligatory by law. However, MR children will not profit from this law until all schools institute parallel MR kindergartens and grade schools. The temporary results of the lack of special schools for MRs are non-attendance at school by MR children or grade school attendance with consequent damage. (1 ref.) - *S.P. Glinsky, Jr.*

Heil- und Pflegeanstalt
7055 Stetten i.R.
West Germany

458 MAGDOL, MIRIAM SPER. An historical perspective to physiological education. *Academic Therapy Quarterly*, 3(3):162-170, 1968.

Contemporary theorists on physiological education such as Kephart, Delacato, Getman, Frostig, and Barsch emphasize that basic modalities must be organized before social competence, vocational preparation, emotional stability, or intelligent participation in activities are possible. Early advocates of physiological education including Locke, Rousseau, Condillac, Periere, Itard, Seguin, Montessori, and Decroly were in agreement with modern theorists concerning the importance of modality function. However, modern theories now distinguish many subtypes among children earlier identified as MR. The learning emphases of modern theorists include motor and visual-motor training (Kephart), motor training (Dalecato), visual training (Getman), visual perception training (Frostig), and training in the meaningful use of the processing modalities (Barsch). (15 refs.) - *J. King.*

Public Schools
Madison, Wisconsin 53700

459 FORREST, MAUREEN. The whole child. *Mental Health*, (Summer):11-13, 1968.

The Scott Report introduced a new approach and an educational concept that is now used in many training centers to meet the needs of SMR children and to enhance their opportunity to develop to their maximum potential. The curriculum of training courses for teachers of the SMR has expanded to include methods for the development of the whole child. Center teachers participate in programs which encourage SMRs to develop healthy personalities, socialize, converse, and develop meaningful speech, initiative, motivation, and responsibility. Newly constructed buildings that have an attractive, pleasant, comfortable, and appealing physical atmosphere provide a stimulating environment and teachers utilize modern equipment and progressive methods in teaching. There is an immediate need for the local inspectorate to act with continual interest and in a supportive role. Center teachers feel the need for better lines of communication and constructive guidance from experienced and knowledgeable professionals in the field. (No refs.) - *S. Half.*

460 NEWTON, WINIFRED. Wolverhampton Remedial Teaching Service—Diagnostic Unit. *Remedial Education*, 2(2):25-28, 1968.

Children in remedial classes who display academic failure without obvious cause are recommended by headteachers to the Diagnostic Unit of the Wolverhampton Remedial Teaching Service. The Unit provides a clinical diagnosis based on intelligence and perceptual tests and clinical judgment. Referral may be to the Psychological Service, special education classes for the EMR, or continued remedial education. (No refs.) - *C. Rowan.*

No address

461 BROWN, E.B. St. Michael's Day Special School, Warwick: Diagnostic Assessment Unit: Report on first year. *Remedial Education*, 2(2):29-32, 1967.

A Diagnostic Unit established on the grounds of a special school educates 5 to 9-year-old children who are unable to benefit from an ordinary school curriculum. The children are observed during a program which includes free play, art, pet care, reading preparation, and group activities such as worship, music, physical training, and story-telling. Even severely disturbed or retarded children benefit from the stimulating and permissive environment and their presence does not hinder the progress of other group members. Placement in a Training Center or Psychotic Unit, or "promotion"

to a special school is determined by long-term progress or regression in both group integration and academic achievement. The Diagnostic Unit and the special school have mutually benefited from their close location in that older children from the special school have assisted in Unit activities and gained from their contact with younger children. (No refs.) - *C. Rowan.*

St. Michael's Day Special School
Warwick, England

462 CRUICKSHANK, WILLIAM M., PAUL, JAMES L., & JUNKALA, JOHN B. *Misfits in the Public Schools.* Syracuse, New York, Syracuse University Press, 1969, 216 p. $6.00

The forward movement of special education in the United States requires that (1) the closed systems under which universities and public schools presently operate be replaced by open systems, (2) innovative education methods be used, (3) teacher education become less concerned with trade-oriented systems and more concerned with providing teachers with a flexible approach to and an in depth understanding of, the fundamental problems of special education, and (4) public schools assume more responsibility for change and innovation. University preparation programs for special education teachers should de-emphasize the inflexibility that results from overspecialization and the current preoccupation with medical concepts and pathology. Their emphases should be on the common factors of several disability groups and on the development of the conceptual bridges that exist between special education and the social sciences. This approach would require changes in certification, and in the structure of special education administration in public schools, colleges and state departments; and the adoption of new concepts. Clear innovation needs at the present time include changes in both the people in, and the values of, educational systems; the validation of present innovative practices and the deletion of programs which have been invalidated; clear statements of rationales, goals and means of evaluation; the discovery of the most effective means of managing change and of freeing personnel from routine tasks; and the sharing of the innovative mission among various institutions and disciplines. This book should be of interest to educators and special educators as well as to personnel in disciplines involved in innovation in the special education field. (35 refs.) - *J.K. Wyatt.*

CONTENTS: The Establishment Against the Child; Some Thoughts on Innovation; The Role of the University in Changing Educational Patterns; The Role of the Public Schools; The Climate for Achievement; Sharing the Innovative Mission.

463 DOUGLASS, SADIE M. The problems of sex education for the educable mental retardate in the day school. In: *Selected Convention Papers: 46th Annual International Convention*, held in New York, New York, April 17-20, 1968. Washington, D.C., Council for Exceptional Children, p. 264-269.

Marked changes in societal customs have made sex education for the MR an increasing concern of teachers. Broadly defined, sex education encompasses such areas as physical growth and maturation, family relationships, role identity, self-image, and the traditional areas of reproduction and puberty. Sex education is an important problem for the MR because of their limited conceptual abilities, inability to delay gratification, and social class background which is likely to be different from that of their middle class teachers. Effective sex education requires the cooperation of parents and teachers. Teachers should be knowledgeable about, and comfortable with, sexual customs and language. Only 21 of 250 teacher training institutions prepare teachers in sex education. Two organizations, the Project on Recreation and Fitness for the Mentally Retarded and The Sex Information and Educational Council for the United States, have begun a project calling for information collection, committee review and evaluation, and subsequent dissemination of pamphlets, books, and other material. Research on the effectiveness of various teaching methods and instructional materials will aid in the sex education of the retarded. (5 refs.) - *J.M. Gardner.*

464 GORDON, SOL. *Facts about Sex for Exceptional Youth.* East Orange, New Jersey, New Jersey Association for Brain Injured Children, 1969, 39 p. $2.95.

To avoid sexual difficulties and teasing by classmates and friends, handicapped adolescents need to understand sex and the language associated with it. The worry experienced by young people concerning sexual impulses or dreams will be reduced when they understand that everyone has sexual thoughts and desires. This brief introduction to some facts about sex is limited mainly to physical aspects. It should be read and discussed by both handicapped children and their parents. Topics considered include sexual intercourse, the male, the female, love, sex before marriage, sex problems, and prevention of pregnancy. This book should be of interest to handicapped adolescents, the parents of handicapped adolescents, psychologists, social workers, educators, special educators, and pediatricians. (22 refs.) - *J.K. Wyatt.*

465 *Selected Curriculum Activities for All Grades.* Darien, Connecticut, Teachers Publishing, 1968, 92 p. (Price unknown).

Arithmetic, general education, early childhood, language, listening, reading, science, and social studies games which may be included in the school curriculum are described. Arithmetic games may be used to teach the cardinal and ordinal numbers, the order of numbers, counting, the estimation of various quantities, and measurement. Early childhood games deal with imagination and role playing. Language games can help children to tell original stories, express themselves in a group, speak clearly, and improve grammar. Listening games train children to listen attentively. Reading games may be used to improve vocabulary, practice word recognition, check auditory perception, and provide motivation. Science games teach observation, discovery, and the appreciation of physical phenomena. Social studies games help children develop feelings of brotherhood, learn more about their community, and

become familiar with other areas of the United States. This book should be of interest to educators and special educators. (No refs.) - *V.G. Votano.*

CONTENTS: Arithmetic Games and Activities; Educational Games and Activities; Games and Activities for Early Childhood Education; Language Games; Listening Games; Reading Games; Science Games and Activities; and Social Studies Games and Activities.

466 POOLE, WALKER L. Working with the very young. *Pointer*, 12(3):18, 1968.

Preschool low-ability MRs are taught to recognize colors by relating them to foods, fruits, and garments, and to learn parts of the body by singing verses which name and number their limbs and organs. (No refs.) - *V.R. Shaffer.*

Riverside School
Detroit, Michigan 48200

467 KLEIN, MABELLE H. Motivation for reading. *Pointer*, 12(3):19, 1968.

MR children became personally involved in developing reading skills when pets, such as guppies, were provided so that each child could write stories about them. Each child wanted to write about his own pet and to read the stories of the other children. Elaboration of this technique involves the use of vocabulary drills and games. (No refs.) - *V.R. Shaffer.*

West School
Iowa Falls, Iowa 50126

468 ANDERSON, ELAINE. Motivation for reading. *Pointer*, 12(3):19, 1968.

Fundamental observations such as the day of the week, date, year, weather conditions, and presence, absence, or tardiness of classmates comprise the morning "news" and are elicited from MRs as a technique for reading motivation. (No refs.) - *V.R. Shaffer.*

Omaha Nebraska Public Schools
Omaha, Nebraska 68100

469 McCLANE, MARY B. Dramatics improve reading. *Pointer*, 12(3):7, 1968.

Participation in dramatic plays and programs provides reading motivation and a sense of achievement for MRs by allowing them freedom of expression, and encouraging personal development and the proper attitude toward learning. (No refs.) - *V.R. Shaffer.*

Enid Oklahoma State School
Enid
Oklahoma 73701

470 RUVIN, HAROLD. Reading activities for the educable mentally retarded in the elementary school as indicated in U.S.A. curriculum guides. *Slow Learning Child*, 14(3): 172-181, 1968.

In order to teach MR children to read, the teacher should appreciate and utilize general principles of positive reinforcement, a structured program, overlearning, and motivation. She should create a comfortable climate that will make the child want to learn to read. The teaching plan should progress from readiness activities such as auditory, visual, and tactile discrimination; and motor and oral development to reading skills such as sight vocabulary, word attack skills, comprehension skills, oral and silent reading, and studying. A wide variety of general activities such as stories, riddles, jokes, puzzles, hobbies, and listening games may be used for reading instruction. (17-item bibliog.) - *C. Rowan.*

School of Education
Boston University
Boston, Massachusetts 02100

471 HUUS, HELEN. Critical aspects of comprehension. *Slow Learning Child*, 15(2):110-119, 1968.

Critical reading is a skill that is separate from pronunciation skill and reading speed, and involves the process of inference. The 3 levels on which a reader can understand the author's ideas are the literal, interpretation, and assimilation levels. Critical reading lies between the interpretation and assimilation levels. The reader can develop skills which enable him to judge the worth, quality, and validity of his reading, and allow him to be selective. The worth of a literary selection is related to the author's purpose and can only be inferred by the reader. The validity of a work is relative and depends on changes in time, society, and the emotions of the reader. Goodness, truth, and beauty are the criteria used in judging the quality of a literary work. The success of teachers in developing critical readers is dependent on pupil evaluation, and the proper use of materials and methods designed for each child's level. Aspects of critical reading which should be evaluated include the author, content, and style. The development of critical skills helps children to understand that there may be more than 1 side to a question, to maintain objectivity, and to develop their own levels of taste. (No refs.) - *M.T. Lender.*

University of Missouri
Kansas City, Missouri 64100

472 MULLER, M.E. Teaching reading to the brain-injured child. *Clearing House Journal*, Issue 9(August): 29-41, 1968.

A seminar presentation on how to teach reading to the child with brain damage also discussed the importance of considering visual-auditory perceptual problems and behavior difficulties before attempting to teach reading. Classroom considerations include a quiet atmosphere, and only essential furniture. The teacher's manner of dress should be plain to avoid distraction. The child's desk should face the wall away from windows.

Readiness experiences should involve activities for sensory-motor, mental, emotional, and social development, as well as for the acquisition of specific skills of retention and discrimination of word forms and sounds. Formal readiness for visual perception may include activities in discriminating geometric designs, or matching the word to the picture. Auditory discrimination should be a group activity. Since word study is an important part of reading, the child should write some of the words contained in a story on cards and use them as lessons in comprehension. Phonics and whole-word methods should be taught. The use of a marker will reduce distraction. Suggestions for reading activities include the use of picture-word charts, flash cards, scramble word games, a picture sentence scrap book, a picture wheel, exercises in sentence and paragraph comprehension, and story reading lessons. (3 refs.) - *G. Trakas.*

Radford House
Buranda, Brisbane
Australia

473 CHANCE, MAYBELLE. Communication skills for the trainable retardate. In: Kokaska, Charles J., ed. *Selected Speeches from a Workshop for Aides to Teachers of the Trainable Mentally Retarded.* Lansing, Michigan, Department of Education, 1969, p. 16-24.

The key to success in social proficiency and economic self sufficiency for TMRs lies in the development of their language skills. Structured school programs for language development should be aimed at the achievement of relevant behavior change through growth in vocabulary, articulation, sentence usage, and the ability to conceptualize. Perceptual learning begins with compelled attention or learning to listen, the development of which requires the use of simple, clear and varied stimuli. Relaxed teaching methods which provide repetition and reinforcement should be used to develop the language skills of MRs. Language lessons designed on a unit plan provide saturation treatment which inevitably proves effective. Dramatic play provides specific speech training and promotes fluency, socialization, increased awareness, easier school adjustment, and a safe, pleasant, classroom atmosphere. (No refs.) - *J.K. Wyatt.*

474 DUNN, LLOYD M., NITZMAN, MARGARET, POCHANART, PRAYOT, & BRANSKY, MALCOLM. Effectiveness of the Peabody Language Development Kits with educable mentally retarded children: A report after two and one-half years. *IMRID (Institute on Mental Retardation and Intellectual Development) Papers and Reports*, 5(15):1-36, 1968.

A 2½ year oral language stimulation program for EMR children employed Levels 1 and 2 of the Peabody Language Development Kits (PLDK). Thirty-five to 45 minute, daily, oral language stimulation lessons were given to 27 classes in 22 schools. A control group consisted of 9 classes in 6 schools. All schools were located in urban slum areas in the Nashville-Davidson area, and 1/3 of the children were Negro. Language, intellectual development, and achievement were evaluated after 4 1/2 months, 2 years and 3 school years of program participation. A comparison of 48 experimental Ss and 24 control Ss (CA range 8 yrs 4 mos to 12 yrs 5 mos; IQ range 50-83) showed that significantly greater IQ gains were made by the experimental group, indicating that the PLDK aided intellectual development. PLDK lessons appeared to enhance the understanding of verbal meanings and spatial relationships, and were related to significant improvement in language ability. Gains were greater for PLDK Level 1 than for Level 2. Gains on the Illinois Test of Psycholinguistics were primarily on subtests measuring expression and sequencing. The effects of the PLDK treatment on school achievement were unclear. (35 refs.) - *B. Bradley.*

475 REILAND, ROBERT F. Language development program. *Pointer*, 12(3):17, 1968.

The Peabody Language Development Kit, Level 1 is used to enhance the development of the basic skills of speaking and listening of EMR children in Mendocino County Schools (California). (No refs.) - *V.R. Shaffer.*

Mendocino County Schools
Ukiah, California 95482

476 COX, GLADINE. The listening post reinforces learning. *Pointer*, 12(3):16, 1968.

Tapes of the teacher's voice and recorders operated by EMR students are used by a teacher to keep 1 group of students occupied and learning while she works with individual students or with small groups. (No refs.) - *V.R. Shaffer.*

Pease Elementary School
Midland, Texas 79701

477 BASHORE, JANE. A primary newspaper unit. *Pointer*, 12(3):14-15, 1968.

A planned study of newspapers for MRs in pre-readiness, readiness, and primer groups led to: the development of cutting and pasting skills, awareness of dates, weather, and prices; recognition of types of clothing, furniture, foods, and automobiles; and investigation of raw materials used in paper and paste. The ability to recognize items was tested by having the students paste labels in appropriate places in individual scrapbooks. (No refs.) - *V.R. Shaffer.*

Jonestown, Pennsylvania Elementary School
Jonestown, Pennsylvania 17038

478 FURST, ALFRED. Entfaltung des Schreibens und einige Schreibhilfein bei cerebral geschadigten Kindern (Development of writing and writing aids for cerebrally damaged children). *Zeitschrift fur Heilpaedagogik*, 18(8):444-450, 1967.

Cerebral damage is reflected in spastic, athetoid, atactic, atonic, rigid and mixed paralysis; writing is affected in a variety of ways. Basic writing motor functions can be acquired through early recognition of cerebral damage

and the employment of a program of exercises adapted to individual deficiencies. Aids include large pencils progressing to normal size, 3-sided pencils, specially adapted pencil holders, metal-backed paper holders, paper with gradually diminishing space between lines, letter and number patterns, and typewriters. The eventual goal is to dispense with aids so that writing will become a contact with the environment and a means of rehabilitation. (8 refs.; 8-item bibliog.) - *S.P. Glinsky, Jr.*

Sonderschule fur Korperbehinderte
des Bathildesheimes
3548 Arolsen/Waldeck
West Germany

479 BOOTS, HELEN B. The retarded teenager in the home economics program. *Journal of Home Economics*, 60(9):730-732, 1968.

Home economics classes for MR adolescents should strive to promote dignity, usefulness and employability. The selection of teaching techniques, equipment, and curriculum should be flexible and based on individual needs. Classes may include MRs with a CA range of 12 to 32, and MA range of 4 to 10, and an IQ range of 33 to 70. Curriculum must be designed so that students achieve some degree of success in basic mathematics, social awareness, basic logic, and decision-making. (No refs.) - *J.P. West.*

Lakeland Village School
Medical Lake, Washington 99022

480 DOZIER, REBECCA. Simple crafts. *Pointer*, 12(3):20, 1968.

Three useful and inexpensive craft projects for MRs are: candle holders made from lids from aerosol spray cans; pictures drawn or painted on paper meat trays; and clipboards made from scrap wood and clip-type clothes pins. (No refs.) - *V.R. Shaffer.*

Dearing Georgia Elementary School
Dearing, Georgia 30308

481 JONES, CLARICE R. Folk dancing. *Pointer*, 12(3):18, 1968.

Folk dancing for 10- to 12-year-old MRs in physical education courses provided improvement in their self-image and confidence which is vital for the achievement of a happy adulthood. (No refs.) - *V.R. Shaffer.*

Royal Oaks Elementary School
Duarte, California 91010

482 WOOD, TOM. Blue Grass Association has gold mine in Project Action for retarded children. *ICRH Newsletter*, 3(16):1-2, 4, 1968.

A physical education program for MR pupils at Blue Grass School (Lexington, Kentucky) used improvised exercises and equipment which emphasized balance. Balance areas were: a static medium and a static person, a static medium and a moving person. A program of 14 isometric exercises was used to build and maintain muscle tone. Equipment used to teach coordination and balance included: a low-friction revolving platform mounted on the front wheel, bearings, spindles and housing of an automobile wheel; an "over and under" obstacle course of metal bars; a swinging bridge; plywood squares fastened to springs embedded in concrete; and automobile tires embedded in concrete. Student profiles were prepared from the results of tests covering handiness, muscular fitness, body power, perceptual concepts, swimming skills, and posture. Children were ranked on a percentage basis within the school. Cardio-vascular fitness was tested by having each child run up and down a ramp. Pulse rate was checked before, immediately after, and 1 and 2 minutes after the run. A "Force Machine" was developed to measure weakness or strength of muscle groups, and muscle development. Illustrations and detailed instructions are given for construction and use of all equipment. (No refs.) - *E.F. MacGregor.*

Blue Grass School
891 Georgetown Street
Lexington, Kentucky 40500

483 *A Practical Guide for Teaching the Mentally Retarded to Swim.* Washington, D.C. American Association for Health, Physical Education, and Recreation, 1969, 152 p. $2.00.

This guide was developed to help recreational directors and swimming instructors of various backgrounds develop a recreational and instructional program of swimming for the MR. Swimming not only contributes to physical fitness and motor coordination but also offers the student an opportunity for success, self-confidence and fun. The text covers the field from pool selection and program development to specific instructional techniques. The key words are innovation and planning—planned achievement by breaking down complex patterns into simpler ones and planned recognitions and awards. Patience is a prime requisite, for each individual learns at his own speed. A multisensory approach to basic skills, assistive devices, and competitive and skill games provides the instructor with a wealth of technical skills and some theoretical background. This is a valuable guide for all people interested in recreational programs for the MR and it might also be applied to programs for physically handicapped and normal children. (54-item bibliog.) - *E.L. Rowan.*

CONTENTS: Swimming and the Mentally Retarded; Organizing and Administering the Program; Methods; Teaching Progressions; Stunts and Games Applied to Swimming Programs for the Mentally Retarded; Pool Facilities; Behavior Modification Techniques for Teaching Swimming to the Mentally Retarded.

484 PLUE, WILLIAM VILAS. A study of work aptitudes in an educable retarded sample. *Dissertation Abstracts*, 29A(2):518-519, 1968.

Job oriented exercises were used for either a 6- or 12-week period to explore the selected work aptitudes of 206 EMR ninth and tenth grade special class Ss. Analysis of pre- and post-treatment scores on the MacQuarrie Test of Mechanical Abilities revealed a significant relationship between treatment exercises and clerical perception, form perception, finger dexterity, manual dexterity, and total performance. Treatment resulted in increased functioning in motor speed and perceptual discrimination. (No refs.) - *J. King.*

No address

485 GREENSILL, R. Pre-vocational guidance—An experiment in interaction between school and society. *Slow Learning Child*, 15(2):102-109, 1968.

A prevocational guidance course was established for students in the third year of secondary school whose intellectual ability was below average. Selection was based on reliability, work habits, and ability. Reliability was the most important criterion. The program included 1 full day of non-paid work each week in a job selected by the student. Two, 6-month-long job choices were made by each pupil. At the end of each period of employment an assessment which became a part of the school record was made by the employer. Regular checkups on the job enabled the teacher to determine strengths and weaknesses, and to make necessary program adjustments. Success of the program was demonstrated in that 17 of 20 students chose permanent jobs in 1 of the 2 job categories in which they had worked, and over 1/2 of the students were hired by employers with whom they had been placed during the program. After some difficulty, an insurance program carried by employers covered possible accidents to the students while at work during the first year. After the second year of the program, a School Board policy covered any student not adequately protected by company insurance. (No refs.) - *E.F. MacGregor.*

Spotswood College
New Plymouth, New Zealand

486 JERROLD, M.A., & FOX, R. "Pre-jobs" for the boys. *Special Education*, 57(2):15-17, 1968.

A project at the Cliffdale Secondary School for educationally subnormal children (Portsmouth, England), teaches EMRs to perform semi-skilled jobs and to function adequately as members of a work team. The EMRs are assigned to the factory during their final 2 terms at the school. The work they do is actually requested and specified by outside industry. The job routine consists of normal industry conditions which are modified at first and gradually intensified. This routine includes: punctuality, completion deadlines, safety procedures, confident handling of machinery, and teamwork. Graduates (who were all boys until recently) of the factory training project have been highly successful at obtaining and holding outside industrial jobs. However, adequate evaluation of the project's success is difficult because of the small number of graduates and the lack of a control group for comparison. (No refs.) - *J.P. West.*

Cliffdale Secondary School
Portsmouth, England

487 TALKINGTON, LARRY W. Frostig visual perceptual training with low-ability-level retarded. *Perceptual and Motor Skills*, 27(2):505-506, 1968.

Evaluation of a visual perception training project based on the use of Frostig-Horne materials with SMR and PMR students at the Boulder River School and Hospital (Montana) revealed significant (p less than .005) improvement in the areas of eye-motor coordination, figure-ground discrimination, figure constancy, position in space, and spatial relations. There were 50 Ss in the experimental (E) group and 50 in the control (C) group (IQ range 17-48; CA range 84-220 mos). All Ss were given the Frostig Developmental Test of Visual Perception. The E group received 3 months of perceptual training in which Frostig-Horne materials were used for 1 hour a day, 5 days a week. The C group spent an equal amount of time in preschool classroom activities. The findings of this study indicate that visual perceptual training appears warranted for MRs at this low ability level. (5 refs.) - *B. Bradley.*

Boulder River School and Hospital
Boulder, Montana 59632

488 JAKEMAN, DENISE. Using the Frostig Programme, *Special Education*, 57(2):25-28, 1968.

A 10-year-old spastic diplegic boy (WISC Performance IQ 53; Verbal IQ 114) demonstrated improved visual and auditory perception and enthusiasm at his progress after a 10-month Frostig remedial program which included structured routine, motor-skill exercises, practice in following instructions, use of the phonic vocabulary, training in form constancy and spatial relationships, and physical education to develop body awareness. The Frostig Test of Visual Perception, the Wepman Test of Auditory Discrimination, the WISC, and the Illinois Test of Psycholinguistics were used to assess strengths and weaknesses so that an individual program could be planned. The Frostig remedial training program includes assessment of the child's needs and an individual program planned for sensory-motor, language and perceptual development. (No refs.) - *C. Rowan.*

Marianne Frostig Center
Los Angeles, California 90033

489 FROSTIG, MARIANNE. Sensory-motor development. *Special Education*, 57(2):18-20, 1968.

Although sensory-motor skills are extremely important to total development, education and training in other phases of development should not be delayed or considered completely dependent upon prior training of sensory-motor skills. The sensory-motor phase in the development of the normal infant ranges from birth to 24 months and includes 4 stages: control of his own body, manipulation of his own body, self-awareness, and awareness of the world. Although deficiency in sensory-motor skills affects total development, overemphasis of the importance of physical function should be avoided with handicapped children in order to prevent possible self-frustration. The belief that development of perception is dependent upon body movement and motor development should be modified since experimental and child development studies show that 3-dimensional discrimination ability is present in infants a few weeks old and in children whose physical movements were curbed (such as with splints or cerebral palsy) during the sensory-motor phase. Since motor handicapped children can be trained to perceive, communicate, and concentrate, their deficiency in motor ability should not be regarded as a problem which requires solution prior to training in other areas, but as a handicap which will be reduced as a result of diversified training. (14 refs.) - *J.P. West.*

Marianne Frostig Center
of Educational Therapy
Los Angeles, California 90033

490 APPLEGATE, ELLEN. Perceptual aids in the classroom: Large muscle coordination (Part II). *Academic Therapy Quarterly*, 3(3):181-183, 1968.

The metronome and balance board can be used to develop large muscle coordination by acquainting children lacking in adequate rhythmical motor planning with the balance and rhythm used in daily activities. The metronome can be used for jumping rope, throwing bean bags, walking, running, spelling, reading, and various activities devised by the teacher. Rhythmical activities may be practised to the metronome beat with the body parts in isolation and with 2 movements in coordination. A balancing board may be used in various foot positions, and for jumping. Its use can be accompanied by activities such as spelling, recitation, bean bag throwing, or games. (No refs.) - *J. King.*

DeWitt Reading Clinic
Napa, California 94558

491 CRATTY, BRYANT J. *Developmental Sequences of Perceptual Motor Tasks: Movement Activities for Neurologically Handicapped and Retarded Children and Youth.* Freeport, New York, Educational Activities, 1967, 88 p. $2.95.

Developmental sequences of perceptual-motor activities which aid in the education of MR and neurologically handicapped children are presented in this text for use by teachers, professional people, and parents. Perceptual activities help the exceptional child learn, and MR and neurologically handicapped children learn best by doing. Activities included are designed to enhance balance, body-perception, thinking, ball catching and throwing, agility, locomotor behavior, and manual dexterity. This list of activities should be used as a springboard into other activities. (123-item bibliog.) - *K.B. Brown.*

CONTENTS: Perceptual-Motor Characteristics of Mentally Retarded and Neurologically Handicapped Children and Youth; Teaching Guidelines; Perceptions of the Body and of Its Position in Space; Balance; Locomotion; Agility; Strength, Endurance, Plus Flexibility Equals Fitness; Catching and Throwing Balls; Manual Abilities; Moving and Thinking; Summary and Program Suggestions.

492 CRAWFORD, JOHN E. *Children with Subtle Perceptual-Motor Difficulties.* Pittsburgh, Pennsylvania, Stanwix House, 1966, 264 p.

This overview of the effects of perceptual-motor difficulties in children emphasizes problems displayed in school and is directed primarily toward professional workers, such as teachers, who come into active contact with children displaying these difficulties. Major areas of concern are: diagnosis, behavioral reactions, emotional problems, endocrine dysfunctions, parental problems, and CNS dysfunctions. The numerous drawings provide examples of perceptual distortions and a glossary of special terms is included for reference purposes. Specific information to guide teachers in the recognition of perceptual disturbances within their classrooms is cited. The need for a positive emotional environment for this population is stressed. Case history data illustrates clinical characteristics and a brief description of drugs and their effects indicates the types of pharmacological assistance available for management problems. Multidisciplinary approaches may contribute to the early recognition of a child's specific learning problems which is essential to good remediational programs. (32-item bibliog.) - *B. Bradley.*

CONTENTS: These Are Our Children Too; Some Differentials About These Children; These Boys and Girls Are Being Helped; The Best Catalyzer Still Is a Good Teacher; Alert Teachers Can Discern the Signals; Emotional Conflicts Often Cloud the Picture; Many of These Children Have Gone Misunderstood So Long; Endocrine Dysfunctions Can Upset School Ability Too; Some Central Nervous System Dysfunctions; Most Family Doctors Now Can Spot CNS Trouble in Children; Other Clinical Facets of These Children; Some Pharmacotherapy Aids Are Here Now; Parents Need Wise Support and Therapy Too; Early Recognition Can Avert Some Complications; and Intimations of Important Breakthroughs Just Ahead.

493 WEDELL, K. Some implications of perceptual-motor impairment in children. *Remedial Education*, 2(2): 5-9, 1968.

Children with defects of the central nervous system (CNS) often display perceptual-motor impairment which may involve sensory input, the ability to concentrate, concept aquisition, the control and organization of hand movements, and eye-hand coordination. While remedial measures are necessary for

reading and arithmetic progress and security in daily activities, the effectiveness of present remedial programs needs to be validated. When the infinite variety of CNS defects, the fact that "normals" also vary in intellectual functioning, and the disadvantages of possibly upsetting good compensatory techniques are considered, the need for further research to evaluate present programs and achieve greater effectiveness becomes apparent. (16 refs.) - *C. Rowan.*

University of Birmingham
Birmingham, England

494 KROP, HARRY D. Education and the self-concept of the mentally retarded. *Training School Bulletin*, 65(2): 57-64, 1968.

The purpose of this investigation was to study the effects of educational experience on the mental ability, academic achievement and social adjustment of the MR. Fifty-eight institutionalized females, divided into a control group and a school group, were administered the Goodenough-Harris Test on 2 different occasions. Between the testing sessions, the school group participated in an educational program while the control group continued its normal routine. The results indicate that the mental ability, school achievement, and social adjustment of the MR, as measured by human figure drawings and teachers' ratings, improve significantly with participation in an educational program. (23 refs.) - *Journal abstract.*

University of Miami
Miami, Florida 33146

495 GORDON, SANDRA. Who am I? *Pointer.* 12(3):13-14, 1968.

A teaching technique for EMRs which encourages self-awareness and the ability to relate to family, class, and environment, primarily involves a "Who Am I?" booklet in which EMRs verbally express their interpretations of pertinent statements which the instructor types in the booklets. (No refs.) - *V.R. Shaffer.*

Braddock Elementary School
Annadale, Virginia

496 KERSHNER, JOHN R. An investigation of the Doman-Delacato Theory of Neuropsychology as it applies to trainable mentally retarded children in public schools. In: *Selected Convention Papers: 46th Annual International Convention*, held in New York, New York, April 14-20, 1968, Washington, D.C., Council for Exceptional Children, p. 261-264.

A structured program of physical activities consistent with the Doman-Delacato Theory of Neuropsychology was used with public school TMR children. The theory hypothesizes that mental and physical development are related and proceed in a sequential manner, and that physical exercises can enhance neurological functioning and result in increased cognitive abilities. Sixteen experimental Ss (E) and 14 placebo-control Ss (C) were trained over a 4 month period. The groups differed initially in intelligence, but not in general motor proficiency or creeping-crawling skills. Training for the E group was based on Doman-Delacato procedures, while training for the C group was nonspecific. As predicted, E Ss improved significantly more than C Ss in creeping-crawling. Although both E and C Ss improved in general perceptual motor functioning, there were no significant between-group differences. The Doman-Delacato hypothesis that proficiency at higher levels is dependent upon the successful completion of lower level skills was not supported. Although the E group did evidence significantly greater gains in cognitive ability, the significance of pretest differences confound this finding. Further research on the use of programs based on the Doman-Delacato Theory is needed. (No refs.) - *J.M. Gardner.*

497 HOWARD, JOYCE L., & PLANT, WALTER T. Psychometric evaluation of an Operation Headstart program. *Journal of Genetic Psychology*, 111(2):281-288, 1967.

An evaluation of an Operation Headstart program for 33 students using the Stanford-Binet, (Form LM), the Peabody Picture Vocabulary Test, the Pictorial Test of Intelligence, and a new experimental intelligence test demonstrated that Operation Headstart students performed significantly (t test) better after approximately 6 and 16 weeks in kindergarten than a comparable group of non-Headstart children. The intelligence test mean of the Headstart children was higher after the preschool experience than before, and higher than the mean for non-Headstart students; this despite the fact that this particular Headstart program was largely unplanned and unprogramed. Future studies to determine the value of preschool programs in terms of short term and long term gains are needed. (16 refs.) - *K. Drossman.*

Department of Psychology
San Jose State College
San Jose, California 95112

498 NADESEN, ARDELL. An evaluation of everyday experiences of preschool cerebral palsied children. *Cerebral Palsy Journal*, 29(2):10-11, 1968.

An investigation of the places visited and the experiences of 60 preschool CP children, aged 2 to 7 years, revealed that all had been to the supermarket, and that a majority had visited a park, department store, playground, airport, dentist, and farm. More than 50% had ridden in a grocery cart, been to a picnic, licked a sucker, opened a drawer, turned on a TV, turned on a faucet, picked flowers, used scissors, watched a parade, put a letter in a mailbox, and attended a birthday party. All were enrolled in 4 public and private schools in Minneapolis and St. Paul during the 1965-1966 school year. Data were obtained from parent questionnaires. These children had less hand than leg involvement. A little more than 1/2 had spasticity, and 1 child was athetotic. Girls slightly surpassed boys in number of places visited. This may have been due to the fact that

girls had less involvement of the extremities than boys. (No refs.) - *M.L. Wiltshire.*

Bemidji State College
Bemidji, Minnesota 56601

499 JOHNSON, JOHN T. The relevance of "brain damage" for the fields of psychology and education. *IMRID (Institute on Mental Retardation and Intellectual Development) Papers and Reports*, 5(21):1-15, 1968.

The usefulness of various concepts and theories of brain damage should be determined by whether or not differential treatment logically follows diagnosis. The numerous approaches to the remediation of the deficits of the brain-damaged individual can be divided into those which are based on developmental theory and stress the process of learning, and those which emphasize current level of functioning and the product of learning. The diagnosis of brain damage contributes little to the understanding of a child nor does it lead to specific remediation techniques. Process-centered approaches have received only limited empirical testing and little support for them has been found. Product-centered approaches are characterized by an operational definition of a specific learning disorder, assessment of the strengths and weakness of the individual, and remediation planned on the basis of test findings. The identification of specific learning disorders combined with the use of behavior shaping techniques appears to be a feasible approach to remediation. This approach should have considerably more meaning for psychology and education than a diagnosis of brain damage as an explanation for behavior which is not accompanied by recommendations for treatment. (54 refs.) - *A.W. Jordan.*

George Peabody College
for Teachers
Nashville, Tennessee 37203

TREATMENT AND TRAINING ASPECTS—PSYCHO-SOCIAL

500 TALKINGTON, LARRY W., & HALL, SYLVIA M. Use of a frustration technique to reinstate speech in nonverbal retarded. *American Journal of Mental Deficiency*, 73(3):496-499, 1968.

A technique based on frustration theory was used to reinstate verbal responses in 2 SMR, nonverbal boys (CAs 14 and 22 yrs) who had a history of language prior to institutionalization. The variable of canteen participation was raised to a significant level of expectancy and then used in a frustration technique as a reward/nonreward variable. Ss evidenced a significant increase in word responses over an 8-week period and daily increases were still occurring at post-testing 2 weeks later. Increases in word responses occurred for both the frustration and non-frustration trials. However, frustration trial responses considerably exceeded those of non-frustration trials. Both Ss are now participating in a speech development program which employs reinforcement techniques. (7 refs.) - *J. King.*

Boulder River School and Hospital
Boulder, Montana 59632

501 BARNES, KENNETH. First words. *Teaching and Training*, 6(3):84-88, 1968.

A 15-year-old mongoloid boy without speech was taught to respond—physically at first and later with sounds and words. The pattern used in this case started with eye contact (a wink) which was followed by an increase in tempo of physical activity and individual speech lessons. Exercises of the mouth and facial muscles and instant response to any speechmaking effort aided progress and encouraged further efforts. The experiences of previous years combined to accelerate progress once the breakthrough into speech occurred. (No refs.) - *E.F. MacGregor.*

Bennett House School
Abingdon
Berks, England

502 SHELTON, JAMES T. Habilitation of disturbed adolescent male retardates. *Mental Retardation/MR*, 6(2):30-33, 1968.

A program designed to habilitate disturbed adolescent male retardates is being conducted at the Porterville State Hospital (California) under a 3-year grant. The staff is using the concepts of therapeutic modalities of environmental manipulation, group interaction, and individual problem treatment in a therapeutic community. Reinforcement of the program is stressed through operant conditioning and the psychiatric technician is recognized as the key therapeutic person on a staff that includes physicians, dentists, psychologists, social workers, rehabilitation therapists, nurses, and school teachers. Forty-two males (CA mean 18 yrs; IQ mean 65) are now enrolled. General therapeutic programs consist of personal hygiene, household cleaning, movies, co-ed parties, church services, formal academic education, formal recreational program, vocational rehabilitation for some, and an industrial therapy program. Reinforcement techniques for this therapeutic program include an accumulation of

points system. Set points are needed for participation in desired events. (No refs.) - *G. Trakas.*

Porterville State Hospital
Porterville, California 93257

503 PAINTER, GENEVIEVE. Remediation of maladaptive behavior and psycholinguistic deficits in a group sensory-motor activity program. *Academic Therapy Quarterly*, 3(4):233-243, 1968.

After participation in a group activity program a 6-year-old "slow-learning", withdrawn boy with possible neurological impairment demonstrated improvement in motor skills, IQ score, auditory and vocal abilities, and group behavior. Pre- and post-test Stanford-Binet scores were 85 and 86 while Peabody Picture Vocabulary Test scores were 104 and 120 respectively. The program consisted of 21 sessions and 38 types of motor-sensory activities which included visual, auditory and tactual dynamics, balance, body and spatial awareness, flexibility, and lateral movements. Improved motor and linguistic abilities led to self-confidence and progress at home, in kindergarten, and in psychotherapy. (2 refs.) - *C. Rowan.*

Institute for Research on Exceptional Children
University of Illinois
Urbana, Illinois 61801

504 DUNDAS, M.H. The one-to-one relationship in the treatment of autistic children. *Acta Paedopsychiatrica*, 35(4-8): 242-245, 1968.

Autism has been treated successfully by psychotherapy, namely, a 1 to 1 relationship; however, this treatment is limited by the shortage of skilled professional personnel. A program in which selected volunteers treat autistic children under the supervision of professional psychiatric personnel, has proven effective. Counseling by a psychiatric social worker is carried on concurrently with both parents. (7 refs.) - *M.L. Wiltshire.*

Marlborough Day Hospital
London N.W 8
England

TREATMENT AND TRAINING ASPECTS—OCCUPATIONAL

505 CHAFFIN, JERRY D. Work performance as an influencing factor in the success or non-success of a retarded employee. *Project News*, of the Parsons State Hospital and Training Center, 4(2):7-13, 1968.

A positive correlation was demonstrated between the production rates of 20 MR high school graduates (mean IQ 64.95; mean CA 17.1 yrs) and employers' judgments of their job success. Modification of the production of 8 of these workers resulted in corresponding change in the employers' judgments of success. These findings suggest that routine follow-up and modification of production by a counselor might improve the retardate's job success. Further research to identify other factors that influence an employer's judgment could provide guidelines for the training and placement of MR workers. (6 refs.) - *C. Rowan.*

Parsons State Hospital and Training Center
Parsons, Kansas 67357

506 STEPHENS, WILL BETH, & PECK, JOHN R. *Success of Young Adult Male Retardates.* Washington, D.C., Council for Exceptional Children, 1968, 118 p. (Price unknown)

A study of the efficacy of habilitation training for 100 MR males (CA range 18-26 yrs; IQ range 50-75) disclosed that efficiently performing, socially oriented, satisfied Ss tended to perform well in vocational, sociocivic, and personal success areas when continued guidance was accepted. Work oriented Ss at the lower level of the IQ range and Ss who evidenced erratic performance frequently limited vocational success without comparable performance in personal and sociocivic areas. Failure performance was related to rebellious attitudes, unemployment, a critical regard for others, irresponsibility, dependence on social welfare agencies, extreme parental protectiveness, serious emotional problems, and immaturity. General satisfaction was related to job satisfaction, and a positive attitude toward authority was associated with the acceptance of needed guidance. Social maturity and successful interpersonal relations were related to reasoning ability and divergent thinking. Ethnic groups Ss who evidenced job success and satisfaction with unskilled employment frequently expressed contentment with their family environments, had low scores on the index of social values and on culture biased personality tests, and above average scores on tasks of divergent thinking. Physical size, stamina, and freedom from physical handicaps appeared to be the prime determinants of success. There were significant differences between trained Ss and a control group of 25 untrained Ss on personality variables. In spite of the fact that trained Ss evidenced significantly more exogeneous MR and came from broken homes, they were happier and more persistent, reliable, responsible,

and self-directing than untrained Ss. Additional data on training program effectiveness, marriage and parenthood, law conformity, community life characteristics, and validity of predictive measures are included. (80 refs.) - *J. King.*

507 BIERMAN, ARTHUR. Sheltered and cooperative program for the mentally retarded as a guide to "independent living." In: Kelly, Elizabeth M., ed. *The New and More Open Outlook for the Mentally Retarded.* Washington, D. C., Catholic University of America, 1966, p. 81-87.

Sheltered workshop programs and a school-work research project provide MRs with training in, and opportunities for, independent living. A sheltered workshop is a rehabilitation facility with a controlled environment which promotes progress toward normal living, develops employability, and provides remunerative employment. Services of the sheltered workshop include admission and screening, evaluation, guidance, training for personal adjustment, vocational training, selective job placement, and follow-up. The school-work research program introduces MRs to a vocational rehabilitation service at an earlier age than was previously possible. It involves the cooperative effort of a progressive school system, a state vocational rehabilitation agency, and a sheltered workshop. (5 refs.) - *V.G. Votano*

508 SPEIJER, N. Basic principles of the sheltered workshop. In: Richards, B.W., ed. *Proceedings of the First Congress of the International Association for the Scientific Study of Mental Deficiency*, held September 12-20, 1967, Montpellier, France. Surrey, England, Michael Jackson Publishing, 1968, p. 162-165.

The sheltered workshop is a rehabilitation center where TMRs can work according to their capabilities. As soon as a pupil is able, he is tranferred to more difficult work. Points of failure are carefully investigated. The pupils are paid a fair wage, based on the quality and quantity of their work and behavior, by which they acquire a feeling of self-esteem. The sheltered workshop is a link in the chain leading to the social integration of the mentally handicapped. (No refs.) - *M.G. Conant.*

509 FENTON, J., THOMPSON, MARTHA M., & ROSE, F. Employment opportunities for the mentally retarded in government agencies. In: Richards, B.W., ed. *Proceedings of the First Congress of the International Association for the Scientific Study of Mental Deficiency*, held September 12-20, 1967, Montpellier, France. Surrey, England, Michael Jackson Publishing, 1968, p. 166-176.

A review of the United States federal and New York state Civil Service Systems showed that there are many jobs and job titles that are potentially appropriate for the MR. These job titles include uncomplicated and repetitive work in skilled and semiskilled categories where there is a high rate of turnover. There are opportunities for the government to benefit from, and contribute to, the rehabilitation of the retarded and for MRs to become productive working citizens and taxpayers. Maximum job opportunities for the MR are present when there is a strong commitment to the program at the highest levels of government and a strong educational program to eradicate misconceptions about the MR. (3 refs.) - *M.G. Conant.*

510 SEIDENFELD, M.A. Human potential, society and mental retardation as related to vocational rehabilitation. In: Richards, B.W., ed. *Proceedings of the First Congress of the International Association for the Scientific Study of Mental Deficiency*, held September 12-20, 1967, Montpellier, France. Surrey, England, Michael Jackson Publishing, 1968, p. 38-45.

At the present time, there is no method to assess reliably the potential for independence, self-support, and social adaptability in the MR. The use of operant conditioning procedures with institutionalized SMRs and the correlation of a general ability factor with job success are new approaches to these problems. Inadequate and poorly designed research and lack of consistent effort to develop a well planned program of research and training contribute to difficulties in effecting the use of maximum potential of MRs. (10 refs.) - *M.G. Conant.*

511 BAXTER, JAN. Where do they go from here? In: Kokaska, Charles J., ed. *Selected Speeches from a Workshop for Aides to Teachers of the Trainable Mentally Retarded.* Lansing, Michigan, Department of Education, 1969, p. 27-30.

When TMRs leave the classroom, they may receive vocational rehabilitation services, find employment in sheltered workshops, or participate and/or work in adult activities centers. Although TMRs can work productively, they have problems with intensive internal motivation and self direction which often make it difficult for them to meet the "feasibility" requirement for vocational rehabilitation services. Sheltered workshops do not present a realistic solution to adult living for TMRs. They function to train individuals for later employment in the community and as terminal places of employment. This fragmentation means that there are fewer sheltered workshops on which TMRs can depend for terminal employment. Terminal employment workshops have financial problems because of automation, minimum wage labor laws, and lack of facilities to meet the needs of the numbers seeking employment. The solution to adult living for TMRs lies in adult activities centers. These are recreational-oriented facilities where TMRs can live a more leisurely life, remain in the community, and do some work at their own rate of speed. Program focus is on the continued development of personal and social adjustment skills. The role of the teacher aide will expand in responsibility and will include work with MRs in the community and home visits to parents. (No refs.) - *J. K. Wyatt.*

512 DOWIE, DONALD A. The handicapped learner—a major problem in a vocational rehabilitation centre. *Rehabilitation in Australia*, 5(4):6-9, 1968.

The slow learner, overlooked by academic and vocational educators and unable to find employment,

needs the rehabilitation services of a special industrial training unit. Australia cares for handicapped learners until age 20. The Commonwealth Rehabilitation Service takes in jobless teenagers, laid off because of slowness, absenteeism, and/or inattentiveness, and enrolls them in structured training institutions. The Service is responsible for uncovering and correcting medical and psychological problems. At the present time, it is unable to provide long-term (1 to 2 yrs) follow-through on cases. Special industrial classes would be an innovation to supplement existing sheltered workshops. These units would include a professional team. The preferred training technique would be programed instruction. (18 refs.) - *S.L. Markworth.*

No address

513 LINDE, THOMAS. Service and maintenance: A vocational success story for cerebral palsied persons. *Cerebral Palsy Journal*, 29(4):9-10, 1968.

During the period from January 1962 to March 1963, 21 of 28 cerebral palsied clients were placed in competitive community jobs related to service and maintenance operations by the Cerebral Palsy Work Center of Milwaukee (Wisconsin). The clients had at least a moderate degree of disability. A training unit, under the supervision of an experienced janitor, was established at the Center. As with other job-oriented programs, the best way to overcome skepticism and hesitancy in prospective employers is to demonstrate satisfactory work behavior in the work situation. (No refs.) - *M.G. Conant.*

No address

514 KOKASKA, CHARLES J., KUBAIKO, JAMES H., & WILSON, HERBERT H. *Annotated Bibliography of Literature Related to Industrial Arts for the Mentally Retarded.* Ypsilanti, Michigan, Eastern Michigan University, 1969, 6 p. (Copies available free)

This annotated bibliography of industrial arts literature pertaining to the MR covers the period 1955-1968 and includes data on program guidelines and objectives, teaching techniques, motivation for learning, treatment of the MR child, guidance, programs in industrial arts for EMRs, acceptance of the MR, arts and crafts activities for slow learners, and industrial arts and special education. (20-item bibliog.) - *J. King.*

TREATMENT AND TRAINING ASPECTS—THERAPY

515 WOLF, WILLIAM C. Dental care for the mentally retarded. *Dental Digest*, 72(10):456-461, 1966.

Although most MR dental care cases can be treated similarly to normals, the most important aspect of treatment is a patient and understanding dentist. The dentist must be confident and able to evaluate properly the MR's intellectual and comprehensive ability and ease his apprehensions by nurturing a friendly atmosphere. The first appointment should be scheduled as the last one of the day to allow more time for the initial interview. A medical history should be obtained from the parents, an oral exam performed, and the MR's ability to comprehend instructions determined. Parents should be advised to eliminate the meal preceding the appointment to insure effectiveness of possible premedication. Upon initial introduction of a maneuver, the dentist should explain his actions in simple language. X-rays are usually possible using bitewings; however, in lieu of these, lateral jaw radiographs using occlusal films may be used. When overly apprehensive and uncooperative MRs require premedication, the dosage should be determined by body weight and build, degree and type of brain damage, blood pressure, CA, degree of apprehension, and the amount and kind of other medication being taken. The dentist may use devices, such as a rubber dam and a mouth prop, when treating more retarded, uncooperative MRs, but an assistant is more helpful. The final task of the dentist is to provide parents with education, encouragement, and a schedule for proper nutrition which, it is hoped, will be a step toward reducing dental problems in the 6 million MRs who are predicted to be living in the United States by 1970. (1 ref.) - *V.R. Shaffer.*

1000 S. W. University Drive
Hollywood, Florida 33020

516 YATES, GLADYS. Mentally retarded receive dental care through Baylor's graduate Pedo program. *DDS (Dallas County Dental Society)*, 12(9):1,8, 1967.

The 1750 MR children at the Denton State School (Texas) receive complete dental care from 7 dentists (who participate in the graduate pedodontic program of Baylor University College of Dentistry), a hygienist, and 2 attendants adept at handling the handicapped. The program provides the graduate pedodentists with practical experience, consultation with medical and paramedical staff, and the ability to treat any handicapped child with assurance. (No refs.) - *C. Rowan.*

No address

517 WELLS, ANN. The forgotten three percent. *Journal of the American Dental Hygienist Association*, 41(1):19-20, 1967.

Providing dental care for the MR child requires an understanding of the types of retardation and establishment of rapport with the child. Prompt attention to appointment time, reduction of pain and severity of procedures, and a relaxed permissive atmosphere will minimize the child's fear. (No refs.) - *C. Rowan.*

2100 Mitchell
Clovis, New Mexico 88101

518 BROOK, MAURICE. Dental treatment for the mentally handicapped. *Parents' Voice*, 18(2):22-24, 1968.

Except in a few isolated instances, dental treatment for the MR individual is inadequate. In institutions, this is not only due to lack of funds, but lack of recognition of the problems and importance of dental care and lack of communication between administration and parents. Outside of institutions, dentists are sometimes reluctant to undertake treatment of the MR because of the additional time and patience that are required. (4 refs.) - *E.F. MacGregor.*

No address

519 GOLDSTEIN, IRWIN C., & DRAGON, ARNOLD I. Restorative dentistry under general anesthesia for the exceptional child—as an office procedure. *Journal of Dentistry for Children*, 34(5): 395-398, 1967.

Dental treatment of the MR child may take place in the regular dental office with restraints and heavy premedication, in the hospital under general anesthesia, or preferably, in the office under general anesthesia. As an office procedure, general anesthesia is less traumatic and anxiety provoking for dentist and patient and avoids the inconvenience and expense of in hospital procedure. With sufficient back-up equipment and monitoring devices, 2 dentist anesthesiologists (or a dentist and an anesthetist) can induce and maintain anesthesia and complete the dental work in a safe, efficient, and relatively pleasant manner. (12 refs.) - *E.L. Rowan.*

Eastern State School and Hospital
Trevose, Pennsylvania

520 BERMAN, MARVIN H. *Journal of Dentistry for Children*, 34:493, 1967. (Letter)

As a dental office procedure, general anesthesia is a crutch for dealing with difficult patients. A qualified pedodontist uses anesthesia in a general hospital only after all means of communication with the child have been exhausted. Hospitalization need not be frightening (proper preparation) or expensive (insurance). The hospital setting provides safety, efficiency, and assistance from medical anesthesiologists versed in the techniques and complications of general anesthesia. (No refs.) - *E.L. Rowan.*

6450 N. California Avenue
Chicago, Illinois 60645

521 ALBUM, MANUEL M., BOYERS, CHARLES L., & KAPLAN, ROBERT I. Hospital dentistry for the pedodontist—philosophy. *Journal of Dentistry for Children*, 35(2):153-160, 1968.

Utilization of the hospital operating room for restorative dentistry under general anesthesia may be necessary for the pedodontist in dealing with patients with cerebral palsy or MR when other management techniques have failed. For patients unable to learn office behavior or for those who do not respond to premedication, general anesthesia offers the most efficient and safest method of dental care. Parents must prepare the child for hospitalization and be alert to postoperative difficulties. The team of pedodontist, anesthesiologist, physician, operating room staff, and nursing staff must work closely together in the best interests of the child. To facilitate such cooperation, the dental profession should aid in the development of good hospital dental departments and seek to include hospital dentistry in prepaid insurance plans. (16 refs.) - *E.L. Rowan.*

Medical Arts Building
Hillside Avenue and York Road
Jenkintown, Pennsylvania 19046

522 YOUNG, WESLEY O., & SHANNON, JEAN H. Providing dental treatment for handicapped children. *Journal of Dentistry for Children*, 35(3):225-240, 1968.

A 3-year pilot project to provide dental care for non-institutionalized, handicapped children in Idaho included special training for selected dentists in dealing with cerebral palsied and MR children, mobilization of community agencies for casefinding and transportation, and an accurate estimate of the cost of the program. Of the 259 children who took advantage of the program initially, 179 completed at least 1 recall examination. The magnitude of the initial work was consistent with the dental neglect common to handicapped children, but apparently lessened because of the extent of fluoridation in Idaho. The time and cost of maintenance was minimal. Handicapped children can be provided with good office care at reasonable cost, and such programs should become part of state health departments' dental-care plans. (11 refs.) - *E.L. Rowan.*

University of Kentucky—College of Dentistry
Lexington, Kentucky 40500

523 TOCCHINI, JOHN J., LEVITAS, THEODORE C., & REDIG, DALE F. The child patient and general anesthesia in the hospital. *Journal of Dentistry for Children*, 35(3):198-207, 1968.

Restorative dentistry under general anesthesia may be necessary when all attempts to treat a handicapped child

in the office have failed. General anesthesia is always a major procedure and all dental work should be done at one time to minimize the risk. Parents should be made aware of possible complications and a careful preanesthetic evaluation of the patient completed. The dentist should concentrate on dental work and leave the administration of anesthesia to an anesthesiologist. Special steps necessary in restorative dentistry under general anesthesia include an endotracheal tube, eye seal, pharyngeal pack, rubber dam, and mouth prop. (13 refs.) - *E.L. Rowan.*

No address

524 GOTSCH, AUDREY. Handicapped patients a concern to division. *Illinois Dental Journal*, 36(1):385-386, 1967.

Because of the trend toward community placement of physically and/or mentally handicapped individuals, public health workers are concerned about adequate dental care for the 9 million handicapped and MR children who comprise 18% of the national population under 15 years of age. A survey published in 1965 indicated that dental care was not available to non-institutionalized MRs because: dentists overschedule appointments and lack proper training and/or desire to handle the management problems which may be encountered while treating them; public health programs exclude dental care; and parents are apathetic. (No refs.) - *V.R. Shaffer.*

No address

525 JOHNSON, JANET M., & JORGENSON, HELEN. Evaluating patients in music therapy. *Project News* of the Parsons State Hospital and Training Center, 4(5):2-6, 1968.

Information from a standardized music evaluation procedure for newly admitted children at Parsons State Hospital and Training Center is used to make decisions about music therapy. This procedure involves 9 group evaluation sessions, observation by 3 therapists, the use of a prescribed format, and individual sessions when needed. Observers use a standardized form to record data on musical and extra-musical behavior and to indicate when the therapist varies from the prescribed format. The evaluation report contains data on the child's physical appearance, social behavior, functioning in activity, and response patterns. Specific evaluation data include observations of consistent and inconsistent patterns of behavior, the reinforcing effects of music, training needs to build adequate responses to auditory stimuli, type of music therapy most appropriate to the functioning level of the patient, appropriate placement in music therapy classes, and therapy goals. (No refs.) - *J. King.*

Parsons State Hospital and Training Center
Parsons, Kansas 67357

526 HODGES, ALTON. Clinical report: Passive reflex therapy for the non-ambulatory mentally retarded. *American Corrective Therapy Journal*, 22(6):188-192, 1968.

At the Austin State School (Texas), a therapeutic program of adaptive physical education was conducted for 15 PMR, non-ambulatory patients who had the least potential for habilitation. The Ss who were free of conditions which contraindicate exercise received daily passive reflexive therapy based on central nervous system stimulation. Reflexive therapy, the stimulation of natural reflexes, was used because reflexive movement is the most basic of all human movements. The therapy program was designed to improve conditions of spasticity and ataxia and to develop motor skills. Types of exercises used included passive imposition of the tonic-neck-reflex movement, homolateral crawling, and cross-lateral creeping. Evaluation of the program after a year revealed that 3 Ss had progressed in mobility and evidenced reduced spasticity, 4 had lessened spasticity, and 6 had not progressed in either area; therapy was discontinued in 2 patients who showed exercise-aggravated systemic disturbances. (No refs.) - *K.B. Brown.*

Department of Required Physical Education for Men
University of Texas
Austin, Texas 78757

527 VALENTINE, A.A., & MAXWELL, CYRIL. Enuresis in severely subnormal children—A clinical trial of imipramine. *Journal of Mental Subnormality*, 14(27, Part 2):84-90, 1968.

All 16 MR children who received a non-blind trial of imipramine for enuresis showed significantly less nocturnal urinary incontinence on medication. When these same children were given the drug in a double-blind, placebo controlled, cross-over trial, there was no difference between drug and control. It was postulated that the nursing staff unconsciously identified the treatment and set out to confirm their preconceptions—a so-called "placebo effect." Imipramine controls enuresis in mentally normal children and in a subgroup of the MR, but the mechanism awaits further investigation. Psychological factors in drug administration must also be elucidated. (14 refs.) - *E.L. Rowan.*

Glenfrith Hospital
Leicester, England

528 NUDO, LAWRENCE A. The effect of Trilafon on certain audiological measures obtained from an institutionalized mentally retarded population with normal hearing acuity, conductive hearing losses and sensori-neural hearing losses. *Dissertation Abstracts*, 28(8):3512B, 1968.

Forty-one institutionalized MRs were evaluated in terms of the effects Trilafon had on their pure tone air conduction thresholds, speech reception thresholds, and speech discrimination. The Ss had normal hearing acuity, conductive hearing losses, and sensory-neural hearing losses. The results revealed associations between drug administration and improvement in audiological measures and between placebo administration and decreases in audiological measures. (No refs.) - *J.King.*

No address

529 MILLICHAP, J. GORDON. Drugs in management of hyperkinetic and perceptually handicapped children. *Journal of the American Medical Association*, 206(7):1527-1530, 1968.

Drug therapy is useful in the symptomatic treatment of hyperactive children with impaired motor, memory, and speech functions. A complete pre-treatment evaluation including quantification of hyperactivity, intelligence and achievement tests, test of visual and auditory perception, and a complete neurological examination including EEG is essential so that remedial conditions may be identified and treated. The drug of choice in the management of hyperkinesis appears to be methylphenidate (Ritalin) followed by dextroamphetamine, chlordiazepoxide (Librium) and chlorpromazine (Thorazine). Anticonvulsants such as diphenylhydantoin and primidone should be added if there is a history of seizure activity. Phenobarbital aggravates hyperactivity and is contraindicted. Although these drugs appear effective in trials of 4 to 8 weeks, long-term controlled studies are needed. (18 refs.) - *E.L. Rowan.*

American Medical Association
535 N. Dearborn Street
Chicago
Illinois 60610

530 MILLICHAP, J. GORDON, AYMAT, FERNANDO, STURGIS, LORETTA H., LARSEN, KATHERINE W., & EGAN, ROSEMARY A. III. Hyperkinetic behavior and learning disorders. *American Journal of Diseases of Children*, 116(3):235-244, 1968.

The results of the administration of the drug methylphenidate hydrochloride were analyzed for 4 female and 26 male Ss (CA range 5-15 yrs) who evidenced hyperactivity, learning disorders, and minimal brain dysfunction. All Ss attended public schools and were of average intelligence. Examination included case data, physical and neurological tests, EEGs, skull X-rays, blood and urine analyses and evaluation of motor activity, coordination, visual motor and auditory perception, intelligence, conduct, and personality. A double-blind technique and random allocation were used to assign Ss to drug or placebo groups. Each S received an average drug dose of 1.5 mg/kg daily for 3 weeks and the placebo for the same period. EEG findings showed that 29 Ss had neurological signs of minimal brain dysfunction. Mean test scores on all psychological tests improved during drug treatment but were significant only for the Draw-A-Man Test and the Frostig Figure Ground Perception Test. A significant placebo effect which equaled that of the drug was found for the Auditory Perception Test, and for the Frostig Visual Form Constancy and Spatial Relations Perception subtests. (18 refs.) - *B. Bradley.*

Children's Memorial Hospital
2300 Children's Plaza
Chicago, Illinois 60614

PROGRAMMATIC ASPECTS—PLANNING AND LEGISLATIVE

531 ALLEN, R.C. Legal norms and practices affecting the mentally deficient. In: Richards, B.W., ed. *Proceedings of the First Congress of the International Association for the Scientific Study of Mental Deficiency*, held September 12-20, 1967, Montpellier, France. Surrey, England, Michael Jackson Publishing, 1968, p. 89-97.

The state laws of Massachusetts, New Jersey, Virginia, Maryland, Florida, Illinois, and Washington were chosen for empirical study of the operation of civil and criminal laws with respect to the MR. In the realm of civil law, protective services often do not protect because of routinized legal proceedings, lack of adequate staff and facilities, ignorance of legal matters by parents of MR children, excessive protective intervention, ambiguity of terms, substitution of custodial care for home care, multiplicity of agencies, and lack of respect for the individual. Examination of criminal laws indicated that effective mechanisms do not exist to identify significantly impaired persons in the trial process, and that resources for the appropriate treatment of persons so identified are lacking. (7 refs.) - *M.G. Conant.*

532 BOGGS, ELIZABETH M. The impact of federal legislation on development of comprehensive progress for the mentally retarded. In: Kelly, Elizabeth M., ed. *The New and More Open Outlook for the Mentally Retarded.* Washington, D.C., Catholic University of America, 1966, p. 3-16.

The history of federal legislation for the MR may be divided into the professional years (prior to 1945), the parent years (1945-1955), the Congressional years (1955-1960), and the Presidential years (1960-1965). Federal interest in the MR during the professional years was exhibited by the Children's Bureau, the United States Office of Education, the Bureau of Census, and the National Institute of Mental Health. The Social Security Act of 1935 and amendments to the vocational rehabilitation legislation of World War II provided funds for state assistance for MRs and extended rehabilitation services to them. During the parent years, parents discovered the inadequacies of the facilities and services for the MR and organized the National Associatioon for Retarded Children. Relevant federal agencies began to inaugurate and expand clinic, rehabilitation, and

educational services for the MR. With the advent of the congressional years, federal funds were provided for research, education, teacher training, and 80 clinical programs in all parts of the country; interpretations of the Hill-Burton Act of 1946 and the Social Security Law were revised to include MR institutions and MRs; and there was a general quickening of activity in most relevant agencies in the Department of Health, Education, and Welfare. Significant legislation during the Presidential years provided for the establishment of the National Institute of Child Health and Human Development, the construction of MR facilities and comprehensive research centers, the funding of advances in rehabilitation programs, changes in the Immigration and Nationality Act to allow MRs to enter the country under certain conditions, the extension of training programs for special education personnel, and the inclusion of MRs in the "Medicare" bill and the Elementary and Secondary Education Act of 1965. (No refs.) - *J. King.*

533 COOKE, ROBERT E. The free choice principle in the care of the mentally retarded. In: Kugel, Robert B., & Wolfensberger, Wolf, eds. ***Changing Patterns in Residential Services for the Mentally Retarded.*** Washington, D.C., President's Committee on Mental Retardation, 1969, Chapter 15, p. 359-365.

A Mental Retardation Care Act similar to the Medicare Act is needed so that families of MRs can have free choice in the selection of programs and facilities for the retarded. At present, most families, except for a small segment of the upper class, find private care financially prohibitive and have no alternative to institutionalization in monstrous, old, understaffed, isolated facilities. Reimbursement for expenses in hospitals, nursing homes, diagnostic clinics, and for education should be provided. The creation of new services will create widespread employment opportunities. The estimated nationwide cost of such a program is 1.2 billion dollars annually; however, much of this cost would be a replacement for present state and local expenditures for the retarded. (1 ref.) - *A.W. Jordan.*

534 PRESIDENT'S COMMITTEE ON MENTAL RETARDATION. ***The Mentally Retarded in Model Cities.*** Washington, D.C., U.S. Government Printing Office, 1969, 56 p.

The Model Cities Program offers opportunities to alter the relationship between ignorance, poverty, and MR by providing for changes in poverty neighborhoods and in the lives of the people who live in them. The etiology of the MR of 25% of the 6 million MRs in the United States appears to be due to disease, genetic disorder, or injury. The identification of factors which contribute to the MR of the other 75% requires the investigation of the culture, social affairs, and general environment in which they live. The infrastructure of a city is composed of all the things and people who contribute to its functioning and is different for ghetto, suburban, and rural areas. Studies of poverty areas should begin with an analysis of their infrastructures. The Model Cities Program is financed by supplemental and planning grants, regular government funded programs, city funds, and private funds. Local planning groups, local neighborhoods, agencies, and cities need to think about and take steps to deal with the problem of MR. Approximately 50% of the MR staffing funds for the 1969 fiscal year have been tentatively allocated for use in Model City areas. (No refs.) - *J.K. Wyatt.*

535 MARTIN, HELEN. Child abuse in Kansas. *Community Health*, 2(5):4-6, 1968.

Legislation enacted in Kansas in 1965 and 1967 requires that child abuse cases be reported to juvenile authorities and that a central register for abuse or suspected abuse cases be established in the Maternal and Child Health Division. The Division in cooperation with Brandeis University is involved in a nationwide study of child abuse and has found that serious injuries, permanant brain damage and death have resulted from child abuse. Study findings indicate that about 1/3 of the abusing persons are under 23 years of age, that parents of all ages are involved, and that parents, step-parents, adoptive parents, and a few foster parents indulge in child abuse. If incidents or suspected incidents are reported, child abuse can hopefully be prevented. Neighbors, teachers, physicians, hospitals, grandparents, and any individual concerned and interested in the health and welfare of children can report child abuse incidents. Films and pamphlets are available to educate the public in the specific area of the battered child syndrome. A great many child abuse cases are unreported and the incidence of child abuse may actually be on the increase. (No refs.) - *S. Half.*

Division of Maternal and Child Health
Kansas City, Kansas 66100

536 KUGEL, R.B. The United States' plans for combating mental retardation. In: Richards, B.W., ed. ***Proceedings of the First Congress of the International Association for the Scientific Study of Mental Deficiency***, held September 12-20, 1967, Montpellier, France. Surrey, England, Michael Jackson Publishing, 1968, p. 98-104.

Analysis of information on MR programs in the United States indicates that there is a growing national commitment to solve the difficult social, educational rehabilitation, and health problems posed by the MR. Additional programs to educate more people about, and to solve the problems of, MRs are needed. Adequate programs and facilities should be established to train those interested in working with the MR, and to train MRs to be successful employees. The need for effective communication among those groups concerned with the MR can be filled by a central information center. (No refs.) - *M.G. Conant.*

537 LAFON, ROBERT. French policy in the field of mental retardation. In: Richards, B.W., ed. ***Proceedings of the First Congress of the International Association for the Scientific Study of Mental Deficiency***, held September 12-20, 1967, Montpellier, France. Surrey, England, Michael Jackson Publishing, 1968, p. 3-10.

The ministries of National Education and Social Affairs are responsible for the detection, education, and habilitation of the MR in France. The Ministry of Social Affairs is concerned with the mentally deficient child, his family, and his social group; it includes a range of services for child care, mental hygiene, health, and social

well-being. The Ministry of National Education has been amended since 1909 to include classes in special education, especially in the reeducation of the least severely retarded and the moderately severely retarded. Special teachers in these schools are establishing a distinct profession in France. (No refs.) - *M.G. Conant.*

538 VLASOVA, T.A. The Soviet education scheme for mentally retarded children. In: Richards, B.W., ed. *Proceedings of the First Congress of the International Association for the Scientific Study of Mental Deficiency*, held September 12-20, 1967, Montpellier, France. Surrey, England, Michael Jackson Publishing, 1968, p. 81-87.

MR children in the Soviet Union receive a strict education from special education teachers in a special, 8-year, auxiliary school. The program is based on general pedagogical rules and theories. The curriculum includes language, arithmetic, history, social studies, nature, physical education, art, music, and individual speech correction. The vast majority of the graduates successfully perform the job for which they were trained; the only exceptions are those whose oligophrenia is complicated by emotional and volitional disorders. This system is based on trial and error experiences, and on scientific findings from the fields of defectology, psychology, medicine, and others. (No refs.) - *M.G. Conant.*

539 SOUTH CAROLINA COMMISSION ON MENTAL RETARDATION. *File-Y: 35-83:0: A Plan for the Youthful Mentally Retarded Offender.* Columbia, South Carolina, South Carolina Department of Mental Retardation, 1969, 40 p. (Price unknown).

Recommendations of the South Carolina state plan for the care and treatment of the youthful MR offender recognize that the facilities of a juvenile court should be available to all children and that MRs need special correctional units, the services of detention-evaluation centers, and programs aimed at the prevention of juvenile offenses. Correctional units for MR offenders should be the responsibility of the Department of Mental Retardation, should be on the grounds of existing MR residential institutions, and should provide educational and vocational rehabilitation programs. To protect the adult civil liberties of youthful MR offenders, juvenile records should be eliminated when placement in a correctional unit is required, and offenders should be classified as MR rather than as delinquents. Provision should be made for an evaluation of youth in a special unit, and for follow-up and care of MRs and their families for at least 1 year after discharge. Regional detention and evaluation centers should be established to identify offenders with special problems prior to the court's disposition of their cases. Needed prevention practices include teacher education, school testing programs, special programs and classes for MRs within the school setting, and in-service training programs for the various professional disciplines. (No refs.) - *J.K. Wyatt.*

PROGRAMMATIC ASPECTS—COMMUNITY

540 WORTIS, JOSEPH, & WORTIS, HELEN. Who comes to a retardation clinic? Implications for social planning. *American Journal of Public Health and the Nation's Health*, 58(9):1746-1752, 1968.

The inadequacies of specialized clinics as a community's only program for MRs are demonstrated in a study of the M.J. Solomon Clinic for Retarded Children (Brooklyn, New York). A random sample of 500 cases (29.4%) seen from 1950-1959 provided data for the patient profile. Most cases were at the moderate, severe, and profound levels. Almost all in the profound range were encephalopathies. For all categories, 50% were encephalopathies, 20% were mongoloid and 20% were retarded, cause unknown. Clinic physicians rarely diagnosed "familial" retardation and saw few mild, borderline, or pseudo-retarded cases. Only 10% of the cases were Negro although that group represented 30% of the MRs in the New York City school system. Patients' family incomes were higher than the modal $3,000-4,000 for that area. Only 20% of the mothers worked. The more severe the MR, the earlier the cases came to the clinic. Fifteen percent had received no private medical attention. Seventy percent were school age, although only 44% attended school. Of those in school, 31% were not in special classes for MRs. Conclusions were: retardation clinics serve only a small proportion of MRs, the most prognostically favorable and lower class patients do not seek a clinic, and clinics are most useful when they are part of a comprehensive community program. (No refs.) - *S. Markworth.*

Maimonides Community Mental Health Center
4802 10th Avenue
Brooklyn, New York 11219

541 COLVIN, R.W., & ADAMS, MARGARET E. The deprivation hypothesis: Its application to the function of child welfare services in meeting the needs of the mentally retarded. In: Richards, B.W., ed. *Proceedings of the First Congress of the International Association for the Scientific Study of Mental Deficiency*, held September 12-20, 1967, Montpellier, France. Surrey, England, Michael Jackson Publishing, 1968, p. 229-235.

Social welfare services have organized intervention programs for children who are or are in danger of becoming MR. These programs view MR as a reactive

condition which represents the response of a developing organism to negative environmental stimuli. The primary need is for early identification of the problem, followed by prompt intervention. Intervention includes the provision of direct services (day care, homemaker services, services to children in their own homes, services to unwed mothers, and foster care) and coordination of the wider services of the community and other professional fields to provide for the rehabilitation of the child and family. (24 refs.) - *M.G. Conant.*

542 BECK, HELEN L. *Social Services to the Mentally Retarded.* Springfield, Illinois, Charles C. Thomas. 1969, 207 p. $8.75.

If good social services are available for the MR during their entire life span, symptoms may be alleviated, functioning may improve, some measure of independence may be achieved, community or institutional care will be easier, and MRs will be able to achieve more satisfaction for themselves and those around them. Parents of an MR child need special diagnostic, information, and counseling services early in the child's life. Multidisciplinary diagnostic clinics can provide: diagnostic evaluation; recommendations; planning; and medical, casework, and psychiatric treatment. Day care centers, nursery schools, public schools, vocational training facilities, recreational facilities, camps, and church activities can assist in the socialization and mental development of MRs. Community services such as child welfare services, child placement agencies, family agencies, homemaker services, nursing services, and psychiatric clinics should be available to MRs and their families. The philosophy and practices of residential facilities for the MR are in the process of change. Their current emphases are maintaining the family contacts of MRs and establishing themselves as a part of the overall services available to MRs. To apply social work knowledge to family life, social adjustment, the emotional implications of everyday living situations, and the effects of positive and negative reinforcement, services demonstrated as useful should be given greater programing emphasis, and a full range of community services should be developed. This book should be of interest to social workers. (132 refs.) - *J.K. Wyatt.*

CONTENTS: Causes, Evaluation and Planning; Where Are the Mentally Retarded; Behavioral Manifestations in Mental Retardation; Social Implications; The Services; Social Work-Goals, Techniques, and Concepts; Services to the Retarded and Their Families; and Looking Ahead.

543 BANK-MIKKELSEN, N.E. A metropolitan area in Denmark: Copenhagen. In: Kugel, Robert B., & Wolfensberger, Wolf, eds. *Changing Patterns in Residential Services for the Mentally Retarded.* Washington, D.C., President's Committee on Mental Retardation, 1969, Chapter 10, p. 227-254.

The Mental Retardation Act of 1959 in Denmark established an MR service, totally financed by the national government, which provides lifetime services for all MRs and includes compulsory education from age 7 to 21, sheltered workshops, kindergartens, special schools, foster homes, residential living units, medical care, counseling for parents, provisions for homemakers to assist in the home, babysitters, home tutors, day nurseries, holiday vacations, and camps. The Service is divided into 12 regional centers, each of which is administered by an administrator, physician, social worker, and educator. Children's services in the Copenhagen area include residential services and training for 325 MRs and community (extramural) services such as education and training programs for MRs living at home. A similar combination of residential and community services is provided for adults. The total staff for this region is 1,070 persons. Patient care workers generally have 8-12 years of education and are enrolled in a 3-year training program. (No refs.) - *A.W. Jordan.*

544 GRUNEWALD, KARL. A rural county in Sweden: Malmohus County. In: Kugel, Robert B., & Wolfensberger, Wolf, eds. *Changing Patterns in Residential Services for the Mentally Retarded.* Washington, D.C. President's Committee on Mental Retardation, 1969, Chapter 11, p. 255-288.

No other group in Sweden has its social, pedagogic, and medical needs and rights so strongly written into the law as do the MR. County Councils are responsible for the administration and execution of the law and have unrestricted privileges to levy taxes. Although it is generally recognized that small facilities are the most advantageous for MRs, regional residential centers serving areas larger than a county have been created for short- and/or long-term care of certain cases. These cases might include the severely disabled who require considerable supervision, the severely physically handicapped who require intensive treatment or special diagnosis, the multihandicapped, TB cases, or individuals requiring intensive psychological evaluation prior to vocational rehabilitation. At the county level, pediatric and psychiatric clinics, general hospitals, foster homes, day care services, occupational therapy, recreation, physical therapy, medical services, education, and vocational training are provided. Resident to staff ratio is less than 2:1 in all facilities. Future plans include follow-up studies to provide feedback on the effectiveness of various methods and programs. (2 refs.) - *A.W. Jordan.*

545 NORRIS, DAVID. An urban-rural area in Britain: Essex County. In: Kugel, Robert B., & Wolfensberger, Wolf, eds. *Changing Patterns in Residential Services for the Mentally Retarded.* Washington, D.C., President's Committee on Mental Retardation, 1969, Chapter 12, p. 289-312.

Essex County, which has a population of about 1 million, provides day training centers, foster homes, and short- and long-term residential care for 1,207 MR children and adults. An additional 1,217 MRs are served in regional institutions. The county raises 1/2 of the funds to finance these services at a cost of less than 1% of the county's expenditures. With the availability of short-term, temporary, residential care, a family can often handle an SMR child at home. Counselors are available to assist the family and transportation is provided to all day programs. A 1- to 2-year period of paid, mandatory training is provided for all personnel in

the training centers. At the present time, there are no difficulties in recruiting staff. Future plans include large scale program to recruit adequately paid foster parents and an attempt to unite the administrations of community and institutional facilities. (No refs.) - *A.W. Jordan.*

546 KLABER, M. MICHAEL. A densely populated small state: Connecticut. In: Kugel, Robert B., & Wolfensberger, Wolf, eds. ***Changing Patterns in Residential Services for the Mentally Retarded.*** Washington, D.C., President's Committee on Mental Retardation, 1969, Chapter 13, p. 313-340.

Institutions are only 1 part of an array of coordinated services for the MR in Connecticut. Other services include day care centers for MRs ineligible for public school special education classes, sheltered workshops for adolescents and adults, community health clinics, and regional centers which provide life-time care and training. Twelve regional centers have a primary purpose of stimulating new services and coordinating existing ones. These centers provide day care services, sheltered workshops, access to professional services through existing clinics, recreation programs via existing youth facilities, community education on the potential productivity of the MR, and education of professionals concerning modern treatment philosophies. An effort is made to keep the MR at home or in the community by providing sufficient services which include easy access to short-term residential care without court commitment or long waiting lists. (4 refs.) - *A.W. Jordan.*

547 SARASON, SEYMOUR B. The creation of settings. In: Kugel, Robert B., & Wolfensberger, Wolf, eds. ***Changing Patterns in Residential Services for the Mentally Retarded.*** Washington, D.C., President's Committee on Mental Retardation, 1969, Chapter 14, p. 341-357.

There is no existing body of theory to serve as a guide for the creation of new or the alteration of existing settings for the MR. Professionals involved in he creation of new settings quickly become overwhelmed by the difficulty of the task and by the lack of guidelines. The coordination of existing settings is difficult and decisions made in the earliest stages of planning have immediate consequences for the planning group. The overall purpose of planning can easily be obscured by the purposes of the component parts. The intellectual complexity of the planning task can lead to fruitless attempts to reduce complexity. Errors in the planning director's thinking may include: an unawareness of the ideas and goals of those who created the setting prior to his appointment, unawareness of the dynamics of the social structure of which the new setting is a part, and inability to consider all alternatives and think creatively. Settings misfire because the conceptualizations on which they are based are oversimplified, vague, or inaccurate. In this new era in patterns of residential care, a multitude of new settings must be created. This will require the consideration of both the MR and the relationships between the field of MR and the needs of the larger social community. (7 refs.) - *A.W. Jordan.*

548 ***Southeast Regional Conference on Youthful Mentally Retarded Offenders: Proceedings.*** Columbia, South Carolina, South Carolina Department of Mental Retardation, November 18-20, 1968, 41 p. (Price unknown).

The purpose of this work conference for professional persons who have continuous contact with MRs in the Region 4 Area was to present data on the youthful MR offender in the areas of new concepts and precepts concerning housing, definitions and limitations, and additional social concerns aimed at stimulating planning and implementation. Basic discussion areas included: arrest procedures and incarceration; identification, evaluation, and court procedures; court disposition of offenders; after-care and follow-up; and educational and preventive measures. New legislation is needed at all levels to solve the problems which MRs experience with present maladaptive laws. The adequate treatment of youthful MR offenders will also require the prevention of cultural-familial MR, the provision of enriched educational experiences for MR children, the development of a continuum of care for MRs, the adoption of a legal distinction between the "insane" and the MR, the education of law officers concerning MR, and the establishment of appropriate places of secondary confinement for MRs. This conference should be of interest to law enforcement personnel, lawyers, judges, social workers, educators, vocational rehabilitation counselors, administrators of correctional and MR institutions, and legislators. (No refs.) - *J.K. Wyatt.*

549 JONES, GEORGE. The youthful offender who is mentally retarded. In: ***Southeast Regional Conference on Youthful Mentally Retarded Offenders: Proceedings.*** Columbia, South Carolina, South Carolina Department of Mental Retardation, November 18-20, 1968, p. 13-27.

Before the problems of youthful MR offenders can be dealt with adequately, steps must be taken to prevent cultural -familial MR, provide educational experiences designed to counteract the effects of deprived home environments, develop a continuum of care through effective interagency teamwork, provide for a legal distinction between the "insane" and the MR, provide tests of credibility to confessions obtained from MRs, teach law officers the baseline characteristics of MRs, and provide appropriate places of secondary confinement for MRs. The plea, trial, and post trial disposition of an MR youth should be based on the essential medical, social, and psychological differences between the "insane" and the MR. The possibility of a plea of innocent by reason of MR should be considered by the courts. Arresting officers should be sure that an MR offender understands the full scope of the Miranda warnings. If a youthful MR offender is exploited during incarceration in the initial place of confinement, permanent psychological damage can result. Programs for delinquent MRs should provide appropriate living situations for them. These programs should: take place in a democratic atmosphere; be staffed by committed persons; and strive to redesign the self-image, develop new self-perception, encourage constructive qualities, and patiently consume antisocial ways. (No refs.) - *J.K. Wyatt.*

550 BENOIT, E. PAUL. The mentally retarded before the law. In: *Southeast Regional Conference on Youthful Mentally Retarded Offenders: Proceedings.* Columbia, South Carolina, South Carolina Department of Mental Retardation, November 18-20, 1968, p. 28-35.

Solutions to the problems experienced by MRs with maladaptive laws in the domains of entitlement and correction lie in seeking new legislation at all levels. The present outlook in regard to legal entitlement is depressing. Some laws totally disregard the handicap of MR, while other positively exclude MRs from all privileges. The law needs to be adaptive and based on an awareness of MR, especially its degrees and developmental characteristics. An MR should not be placed in an institution until all other alternatives have been explored. Crimes committed by MRs should be correctly interpreted by the law. Consideration should be given to impaired perception of human actions, deviation in conscience development, and limited awareness of responsibility to society exhibited by some MRs. Correction must be based on the full realization of the MR person's understanding of "crime". The correctional process requires human appreciation of the individual, true rapport, love, enthusiasm, genuineness, an active concern for giving tangible good and training. Properly trained correctional personnel should participate in all phases of the correctional process, from arrest to discharge. (No refs.) - *J.K. Wyatt.*

551 CECIL, J. HARLEY. Implications of Reuel L. Howe's philosphy in a ministry to the retarded. Paper presented at the Annual Meetings of the American Association on Mental Deficiency, Denver, Colorado, May 17, 1967, 34 p. Mimeographed.

The philosophy of Reuel Howe, the director of the Institute for Advanced Pastoral Studies (Bloomfield Hills, Michigan), adds psychological and sociological dimensions to theology, attempts to correlate knowledge about man with the truths of Christian theology, and can be appropriately used in ministering to the MR. Howe emphasizes man's need for love, acceptance, and discipline, and the loneliness that results when these needs are not filled. Man's deepest questions about his existence arise out of his experience with crucial ventures in regard to birth, growth, maturity, mating, parenthood, sickness, bereavement, and death. Complimentary requirements of Christian education for any child are to develop the language of relationships in personal encounters and to transmit the subject matter of the historical faith and the life of the Christian community. Lay persons can show their care and concern for the MR by offering a mature helping process to them, adjusting goals for expected accomplishments, recognizing that their ministries will not produce miracles, and finding opportunities for the development of a mutual 2-way involvement. The goal of a person ministering to an MR person should be to develop a relationship that helps him face the daily threats of life and search for personhood. (8 refs.) - *J. King.*

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PROGRAMMATIC ASPECTS—RESIDENTIAL

552 KUGEL, ROBERT B., & WOLFENSBERGER, WOLF, eds. *Changing Patterns in Residential Services for the Mentally Retarded.* Washington, D.C., President's Committee on Mental Retardation, 1969, 435 p. (Price unknown)

This compendium of 17 papers, written by 14 authors, includes: views of present residential facilities in the United States; descriptions of existing alternatives to current models; examples of service models in use in Denmark, Sweden, and England; and presentations of specific philosophies and recommendations for change. Statistical tables and descriptions of personal reactions to visits to rather typical state institutions for the MR are used to demonstrate the deplorable conditions in American institutions. The history of United States institutions and problems of administrating, staffing, financing, locating, designing, and programing are discussed. Residential facilities should be only 1 component of a continuum of services for the MR. Therefore, simultaneous attention should be directed toward the development of both residential and community services. Services for the MR should be designed so that they normalize the life of the MR. Although this book was intended to serve as a source for recommendations to the President, it should be useful reading for legislators, public officials, administrators of institutions, and students and employees in the field of MR. (252 refs.) - *A.W. Jordan.*

CONTENTS: Challenge; Situation; Reactions to Current Residential Models in the United States; History and Development; Toward New Service Models; Model Service Models; Toward New Service Concepts; and Overview.

553 KUGEL, ROBERT B. Why innovative action? In: Kugel, Robert B., & Wolfensberger, Wolf, eds. *Changing Patterns in Residential Services for the Mentally Retarded.* Washington, D.C., President's Committee on Mental Retardation, 1969, Chapter 1, p. 1-14.

Massive re-education of the public, legislators, administrators, and professional workers will be required to improve underfinanced, overcrowded,

outdated, residential services for the MR. Simultaneous attention must be given to community resources. The compendium of papers in this monograph includes a presentation of current residential services and conditions, new models and suggestions for change, and specific recommendations for action. A presentation of basic facts about public institutions, personal reactions to visits to American institutions, and a historical interpretation of attitudes and programs for the MR set the stage for 11 chapters which present logical and useful innovations. Models of services in England, Scandinavia, and the United States (Connecticut) illustrate what can be done. Recommended innovations include the extension of Medicare legislation to the MR and the development of a system of services based on a cost-benefit rationale. Theoretical notions are translated into concrete proposals and evaluated in terms of their feasibility. (6 refs.) - *A.W. Jordan.*

554 BUTTERFIELD, EARL C. Basic facts about public residential facilities for the mentally retarded. In: Kugel, Robert B., & Wolfensberger, Wolf, eds. ***Changing Patterns in Residential Services for the Mentally Retarded.*** Washington, D.C., President's Committee on Mental Retardation, 1969, Chapter 2, p. 15-33.

More than 200,000 of the MR in the United States are institutionalized in large, multi-purpose, overcrowded, understaffed facilities while thousands await admission. The delay between applying for and gaining admission is often longer than 3 years. The attendants, who are the most important persons in the lives of institutionalized retardates, usually have no relevant experience for the job. The high turnover among attendants reflects the very low pay and low status attributed to their position. Professionals in institutions are frequently sub-standard in their qualifications. There are dramatic differences among states in philosophy, resources, number and type of MR served, and amount of money spent for daily care of the residents. The effects of these deplorable conditions on the residents need to be identified so that improvement can be planned. (10-item bibliog.) - *A.W. Jordan.*

555 BLATT, BURTON. Purgatory. In: Kugel, Robert B., & Wolfensberger, Wolf, eds. ***Changing Patterns in Residential Services for the Mentally Retarded.*** Washington, D.C., President's Committee on Mental Retardation, 1969, Chapter 3, p. 35-49.

Few institutions for the mentally retarded are completely free of dirt and filth, odors, naked patients groveling in their own feces, children in restraints and in locked cells, horribly crowded dormitories, and understaffed and wrongly staffed facilities. Barred windows, locks on innumerable inside doors, non-functioning toilet facilities, and crowded rooms of unshaven, toothless residents doing nothing serve as a reflection of the fact that the average amount of money spent/patient/day is about 1/8 the amount spent for general hospital care. More important than a reduction in size of institutions, an increase in staff, or more funds, is the necessity for instilling the belief in patient care workers that all patients are equally human. The general public, legislators, administrators, and health leaders should know about these deplorable conditions. Ignoring the facts about institutional conditions will not make them go away. It is hoped and believed that exposure of these conditions to the public will eventually lead to an improvement of the situation. (1 ref.) - *A.W. Jordan.*

556 NIRJE, BENGT. A Scandinavian visitor looks at the U.S. institutions. In: Kugel, Robert B. & Wolfensberger, Wolf, eds. ***Changing Patterns in Residential Services for the Mentally Retarded.*** Washington, D.C., President's Committee on Mental Retardation, 1969, Chapter 4, p. 51-57.

A foreign visitor to the United States finds it difficult to believe that a society which has the resources to plan and construct hotels, skyscrapers, and expressways with total disregard for cost can tolerate the dehumanization of its citizens in public institutions. Visits to several institutions revealed that taxpayers' money is used to create cultural deprivation where residents are denied privacy, social life, and training. Eighty to 100 residents in one institution spent their days in a large room with windows too high to see out, no toys, no organized activity, and little opportunity to leave the day room. Prevalent understaffing was clearly seen in a case where 1 attendant had to spoon-feed 25 residents in 75 minutes. Regardless of the type of patient to be housed, all buildings were the same. Under these conditions residents have no chance of functioning at or near their maximum attainable level of development. (No refs.) - *A.W. Jordan.*

557 WOLFENSBERGER, WOLF. The origin and nature of our institutional models. In: Kugel, Robert B., & Wolfensberger, Wolf, eds. ***Changing Patterns in Residential Services for the Mentally Retarded.*** Washington, D.C., President's Committee on Mental Retardation, 1969, Chapter 5, p. 59-171.

Institution location, mode of operation, and design have been, and continue to be, influenced by the designer's perception of the MR's role in society, the meaning embodied in the building, and the focus of convenience designed into the building. Just as role expectations are embodied in building design and staff behavior, the MRs' behavior is in accordance with their role expectations. In the 1850's the MR were viewed as deviants who could be cured through education. When this seemed to fail, concern with prevention was embodied in prohibitive marriage laws, sterilization, and attempts at segregation. The view of the MR as a menace is reflected in the abuse resistant design of institutions, including locked living units and barred windows. Attempts to institutionalize all the MR to protect society from their assaultive, delinquent, or prolific nature led to the creation of huge institutions, isolated from society. These were financed through extreme economy, the rationale being that subhuman individuals needed only the bare necessities. In 1920 workers in the field began to recognize that the MR were not dangerous, could adjust to community life, and that the aims of segregation and sterilization could not be achieved. Rationales for inexpensive, isolated institutions were thus removed. Nevertheless, institutions have continued to operate for 40 years as if the views of the early twentieth century were valid. In

most institutions the MR are still denied the rights of privacy, property, and individuality. Institutions operate on a medical model and treat the MR as if they were sick. Isolation, segregation, and strict economy prevail. (176-item bibliog.) - *A.W. Jordan.*

558 BLATT, BURTON. Recommendations for institutional reform. In: Kugel, Robert B., & Wolfensberger, Wolf, eds. ***Changing Patterns in Residential Services for the Mentally Retarded.*** Washington, D.C., President's Committee on Mental Retardation, 1969, Chapter 6, 173-177.

Recommendations for the improvement of institutional programs for the MR include the delegation of responsibility for providing in-service training and consultation for all institution staffs to a state university in each state and the designation of 1 institution in each state as a center for a required in-service training program which must be successfully completed by all new professional and non-professional personnel. Type and duration of in-service training programs would vary depending on the candidate's background and experience. A board of visitors, appointed by the governor, would report directly to the highest state officials. Each department within the institution would have a board of advisors to serve as consultants. At least a doubling of capital expenditures and considerable reduction in the size of institutional populations are primary to institutional reform. Every governor, superintendent, commissioner of mental hygiene, and thoughtful citizen should assume responsibility for the care of the MR. (No refs.) - *A. W. Jordan.*

559 TIZARD, JACK. Residential services within the service continuum. In: Kugel, Robert B., & Wolfensberger, Wolf, eds. ***Changing Patterns in Residential Services for the Mentally Retarded.*** Washington, D.C., President's Committee on Mental Retardation, 1969, Chapter 8, p. 197-210.

Experimentation with residential alternatives to the traditional institutional model is necessary. Before alternatives can be developed, the amount and type of residential services required to serve the population must be determined. The demand should not be determined solely by the prevalence of MR. Other factors which should be considered include: the adequacy of services for MRs living at home; the amount and quality of residential services in operation; the attitudes of medicine, education, and the public toward MR; the age of the child; the age and handicaps of the parents; social and economic circumstances of the family; and the definition of MR. At the present time, residential services are overcrowded, understaffed institutions which emulate a medical model rather than training or educational models. Community services should provide postnatal, obstetric, and other preventative medical services; adequate mental and welfare clinics; counseling and social assistance; education; sheltered employment; vocational guidance and training for adults; and organized provisions for leisure time activities for MRs who live at home. MRs who cannot live at home should receive the same services. Small foster homes and hostels could be tailored to the needs of the particular type of retardate served, and located in population centers so that public facilities and services would be readily available. (13-item bibliog.) - *A.W. Jordan.*

560 DUNN, LLOYD M. Small, special-purpose residential facilities for the retarded. In: Kugel, Robert B., & Wolfensberger, Wolf, eds. ***Changing Patterns in Residential Services for the Mentally Retarded.*** Washington, D.C., President's Committee on Mental Retardation, Chapter 9, p. 211-225.

Principles which should guide the structuring of small, special-purpose residential facilities for MRs include: supervision by the profession primarily trained to provide specialized treatment, the establishment of an open-door policy between the facility and the community, an easy shift in placement from one specialized facility to another, a residential population of 10 to 50 patients, geographic distribution of facilities so that MRs can be as close to home as possible, the development of interstate and regional facilities for the treatment of rare conditions, and the use of the MR label only when required for special treatment. Various facilities might provide intensive, short-term medical treatment in wings and annexes of city hospitals and medical schools; long-term nursing care in nursing homes or in adjunct units of general hospitals; general medical care; child development centers for SMRs; boarding schools for the moderately retarded; rehabilitation and/or boarding centers for young adults; and hostels for adults. These special-purpose residential units appear to be the best alternative to traditional residential facilities. However, empirical evidence in their support is required before large scale implementation can occur. (7-item bibliog.) - *A.W. Jordan.*

561 DYBWAD, GUNNAR. Action implications, U. S.A. today. In: Kugel, Robert B., & Wolfensberger, Wolf, eds. ***Changing Patterns in Residential Services for the Mentally Retarded.*** Washington, D.C., President's Committee on Mental Retardation, 1969, Chapter 17, p. 383-428.

An overview of this volume reveals that broad areas of concern in residential services for the MR are: philosophies and concepts, strategies of change, human management programing, administration and financing, manpower and staffing, and location and design of facilities. The most far reaching implications for future development of services for the MR are embodied in the concept of normalization. This concept implies that deviant persons should be allowed to be as normal as possible, that MR should be interpreted to others in ways that minimize differences, and that public attitudes must be changed so that they will become more accepting of MR. Services for the MR must be an integrated part of the community, dispersed geographically, specialized in function, and continuously available throughout the MR's life span. Programing for an MR must begin as soon as MR is suspected. Although money alone is not the answer for improved services, it is necessary to attract better personnel. In-service training may also work toward this end. (19 refs.) - *A.W. Jordan.*

562 BALL, THOMAS S., ed. *The Establishment and Administration of Operant Conditioning Programs in a State Hospital for the Retarded.* (California Mental Health Research Symposium Number 4.) Sacramento, California, California Department of Mental Hygiene, 1969, 139 p. (Price unknown)

The organizational and functional aspects of establishing and administering an operant conditioning program (Token Economy Program) are presented. Emphasis is on program administration rather than on demonstration of its research aspects. The program requires administrative understanding and support because new policies and procedures regarding staff and patient behavior must be established. When personnel are required to assume a different philosophy and different roles, stress and frustration can result. This program appears to be successful. However, openminded, ongoing reevaluation and changes are essential, if it is to be refined. One aim of the program is to enable administrators to use this data to establish this type of program in their home hospitals. State hospital administrators, researchers, psychologists, educators, physicians, nurses, parents, and social workers will find the information in this symposium of interest. (21 refs.) - *G.M. Nunn.*

CONTENTS: Introduction and Overview (Ball); Medical Director's Point of View on Operant Conditioning Programs in a State Hospital for the Retarded (Bugh); Demands on Staff (Behrens); Initial Selection of Patients (Behrens); Description of the Token Economy Program (Sibbach); School Program (Hasazi); Implementations of New Programs in Ward Care of the Mentally Retarded (Bailey); Operant Conditioning Program (Payne); The Cross-Cultural Use of Operant Conditioning (Cotter); Operant Conditioning Treatment Programs: Obstacles, Problems and Issues (Kilburn & Ray); and Policies and Procedures.

563 BALL, THOMAS S. Introduction and overview. In: Ball, Thomas S., ed. *The Establishment and Administration of Operant Conditioning Programs in a State Hospital for the Retarded.* (California Mental Health Research Symposium Number 4.) Sacramento, California, California Department of Mental Hygiene, 1969, p. 1-12.

The goal of the Token Economy Program (TEP), an operant conditioning program at the Pacific State Hospital (California), is the habilitation of MRs. The program, which began in 1967 with 1 ward, a trained staff, and selected patients, is based on the Patton model and patients are required to earn tokens to pay for all aspects of their daily living accommodations. Written approval from parents is required before patients can participate in the project. A 9-week training course for the staff has been established at Patton State Hospital. Resistance to TEP was evidenced by employees who could not accept the philosophy of the operant approach. Problems which emerged when the TEP met with success were inter-departmental competition and professional chauvinism. Top hospital administrators must be involved in operant conditioning programs from the beginning so that they can understand program potentialities, problems, and complexities; evaluate their own needs; and set goals. (12 refs.) - *G. M. Nunn.*

564 BUGH, VERNON G. Medical director's point of view on operant conditioning programs in a state hospital for the retarded. In: Ball, Thomas S., ed. *The Establishment and Administration of Operant Conditioning Programs in a State Hospital for the Retarded.* (California Mental Health Research Symposium Number 4.) Sacramento, California, California Department of Mental Hygiene, 1969, p. 13-15.

The operant conditioning approach can be used effectively to elicit behavior modification in MR patients. The consistent use of this approach with a patient results in more socially acceptable behavior. Aversive conditioning procedures do not appear to be necessary if positive conditioning methods are followed. Operant conditioning results in individual behavior improvement in patients, effective milieu therapy, improved personnel attitudes and approaches to patients, and the development of consistent and standardized behavior patterns in patients and employees. More study is needed to determine the criteria for selecting patients for this approach. (No refs.) - *G.M. Nunn.*

565 BEHRENS, ROBERT. Token economy program: Demands on staff. In: Ball, Thomas S., ed. *The Establishment and Administration of Operant Conditioning Programs in a State Hospital for the Retarded.* (California Mental Health Research Symposium Number 4.) Sacramento, California, California Department of Mental Hygiene, 1969, p. 16-22.

The demands of the staff involved in the Token Economy Program (TEP) at Pacific State Hospital require the employee to change his behavior from compliant behavior to critical behavior. This change results in extreme frustration and stress on the part of the employee. The employee must memorize the individual programs of each patient assigned to him and make difficult discriminations about a specific individual's behavior. Ward assignments are rotated so no one employee retains a given prestigious job. There is a demand for flexibility and openness to new learning. The behavior of the ward charge (supervisor) must be greatly different than on other ward assignments. Instead of being autocratic and authoritarian, he must reinforce independent behavior on the part of the staff. Although there is a high degree of stress in the TEP, the program has continued to be viable. (No refs.) - *G.M. Nunn.*

566 BEHRENS, ROBERT. Token economy program: Initial selection of patients. In: Ball, Thomas S., ed. *The Establishment and Administration of Operant Conditioning Programs in a State Hospital for the Retarded.* (California Mental Health Research Symposium Number 4.) Sacramento, California, California Department of Mental Hygiene, 1969, p. 23-26.

The selection of patients for the Token Economy Program (TEP) at Pacific State Hospital (California) involved establishing program criteria, obtaining parental permission, and making a final selection among eligible patients. A computer based population survey and ward employee suggestions were used to make a list

which included patients (CA 15-40 yrs; IQ 27-80) with behavior problems who were toilet trained and free of serious physical problems. Seminars for parents of potential participants were designed to obtain their cooperation and written permission for a child to participate in the program. The seminars provided parents with a full description of the program, and over 90% of the parents who attended them permitted their children to participate. The original TEP group consisted of 21 patients. This new procedure for patient selection involved decisions by a psychologist rather than by the social service department. (No refs.) - *G.M. Nunn.*

567 SIBBACH, LOIS. Token economy program: Description of the token economy program. In: Ball, Thomas S., ed. ***The Establishment and Administration of Operant Conditioning Programs in a State Hospital for the Retarded.*** (California Mental Health Research Symposium Number 4.) Sacramento, California, California Department of Mental Hygiene, 1969, p. 27-54.

The Token Economy Program (TEP) at the Pacific State Hospital (California) based on the principles of operant conditioning, rewards appropriate behavior with tokens and either ignores or fines maladaptive behavior. Staff orientation consists of short lectures coupled with practical experiences over a period of time and attempts to clarify the definition, principles, and goals of the program. Behavior observations recorded on cards help the staff to identify behaviors to be reinforced or ignored. Residents are prepared for program participation with explanations of what tokens are and their uses and values. At the beginning of the program a balance of economy existed and the cost of daily necessities equaled the number of tokens that could be earned in a day. The scope of token earning tasks has been gradually expanded and now includes off-ward assignments, ward housekeeping tasks, and individual assignments. This procedure allows residents to earn and use tokens for additional activities. Special Reinforcement Tokens were introduced after the program had been in operation for several months. They are awarded for highly acceptable behavior and have led to increased resident enthusiasm and to an increased awareness of appropriate behavior and its consequences. Constant updating and revision of TEP occur as behavior changes are noted. The ultimate goal of TEP is to provide meaningful training that will enable residents to function productively in the home or sheltered workshop. (No refs.) - *G.M. Nunn.*

568 HASAZI, SUSAN. Token economy programs: School Program. In: Ball, Thomas S., ed. ***The Establishment and Administration of Operant Conditioning Programs in a State Hospital for the Retarded.*** (California Mental Health Research Symposium Number 4.) Sacramento, California, California Department of Mental Hygiene, 1969, p. 55-57.

The Token Economy Program at the Pacific State Hospital (California) has an on-ward school program taught by psychiatric technicians who assume responsibility for 4 or 5 residents for 1 hour a day, 5 days a week. A teacher serves as consultant for this program. Residents are reinforced for responding with tokens, candy, verbal praise, and stars. Since the technicians know each resident, they can identify the best reinforcement, the most effective control procedures, and the individual academic needs of each patient. The use of ward technicians in the school program prevents conflict between academic training and behavioral programing. Although residents and technicians are enthusiastic about the school program, further evaluation of it is needed. (No refs.) - *G.M. Nunn.*

569 BAILEY, BARBARA. Implementation of new programs in ward care of the mentally retarded. In: Ball, Thomas S., ed. ***The Establishment and Administration of Operant Conditioning Programs in a State Hospital for the Retarded.*** (California Mental Health Research Symposium Number 4.) Sacramento, California, California Department of Mental Hygiene, 1969, p. 58-66.

The Hospital In-Service Training program (HIST) at Pacific State Hospital (California) teaches behavior modification procedures and ward management techniques to the ward personnel in order to effect improved patient care. Formal and informal evaluation techniques are used. Formal evaluation includes 5-minute observations before and after training and the categorizing of observations into interaction (employee teaching, talking with or to a patient, touching a patient, or using rehabilitative techniques) or supervision (employee doing routine work, but not interacting) groups. Subgroups of interaction observations are reinforcing adaptive behavior or reinforcing maladaptive behavior. Supervision can be active (carrying out routine ward work) or passive (watching patients rather than interacting with them). Successful teaching results in an increase in reinforcing behavior and active supervision. Informal evaluation includes HIST observation of patient care, patient behavior, and staff behavior. Ward and shift charges are given pre-training in individualized patient care, ward administration, and program implementation. Factors leading to the successful completion and continuance of this program are good patient care, good communication between employees, and personnel acceptance of the program. Informal follow-up is aimed at teaching, reteaching, and enforcing programs. (No refs.) - *G.M. Nunn.*

570 PAYNE, LAWRENCE. Operant conditioning training program. In: Ball, Thomas S., ed. ***The Establishment and Administration of Operant Conditioning Programs in a State Hospital for the Retarded.*** (California Mental Health Research Symposium Number 4.) Sacramento, California, California Department of Mental Hygiene, 1969, p. 67-72.

The California Department of Mental Health organizes 9-week training programs at Pacific State Hospital and Patton State Hospital to orient personnel from other hospitals in the theory and practice of operant conditioning techniques so they can establish and administer similar programs in their home hospitals. Training includes: the presentation of an overview of administrators' functions; trainee evaluation of residents who would participate in this type of program; trainee

work in a self-help skill training session and in behavior modification training; trainee orientation on token economy wards; and theoretical, laboratory, and practical experience in discussions, seminars, observation, and patient involvement. Trainees feel that the program is successful. (No refs.) - *G.M. Nunn.*

571 KILBURN, KENT L., & RAY, EDWARD T. Operant conditioning treatment programs: Obstacles, problems and issues. In: Ball, Thomas, ed. *The Establishment and Administration of Operant Conditioning Programs in a State Hospital for the Retarded.* (California Mental Health Research Symposium Number 4.) Sacramento, California, California Department of Mental Hygiene, 1969, p. 75-83.

The operant conditioning treatment program at Porterville State Hospital validates procedures and findings at Pacific State Hospital and identifies problems, obstacles, and issues which must be resolved. Obstacles to the program include: obtaining needed support from and maintaining the interest of hospital administrators and nursing personnel, delegating authority for the program to the appropriate person, and obtaining the cooperation of the staff and their faithful adherence to the philosophy and practice of the program. The selection of patients who are otherwise ignored as a target group can be a helpful means of gaining acceptance. Problems relating to theory include competing reinforcement systems in institutions which counteract each other and dissimilarities in the environments of the institution and the home which interfere with behavior generalization. Controversial issues involving operant conditioning methods center around the use of deprivation and aversive reinforcement. Operant conditioning programs should be presented honestly and should include specific provisions to protect patients' rights. (10 refs.) - *G.M. Nunn.*

572 COTTER, LLOYD H. The cross cultural use of operant conditioning. In: Ball, Thomas S., ed. *The Establishment and Administration of Operant Conditioning Programs in a State Hospital for the Retarded.* (California Mental Health Research Symposium Number 4.) Sacramento, California, California Department of Mental Hygiene, 1969, p. 73-74.

The Token Economy Program, a program based on operant conditioning procedures, was demonstrated at Pacific State Hospital and Patton State Hospital and used with great success in a South Vietnam mental hospital. Patients participated in occupational therapy programs which included food growing and manufacturing projects. Patients earned their meals and money for clothing and extras only by performing their duties. Previously idle, psychologically and physiologically deteriorating patients became involved in productive activity. (No refs.) - *G.M. Nunn.*

Bureau of Research
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573 GRIEPENTROG, J.F. Essentials to programming within a mental retardation residential training facility. *Broadcaster* (Newsletter of the Beatrice State Home, Beatrice, Nebraska), 25(4):1-2, 1969.

Essential MR program components which should be given equal emphasis to avoid negative program results are specialized training to combat disabling conditions and opportunities to experience life patterns which resemble those available to normal persons as closely as possible. This type of program recognizes both the specialized needs of MRs and their basic needs as people. It should be the responsibility of a multidisciplinary team who should design the program, assess individual strengths and weaknesses, determine the appropriateness of specialized programs, insure program implementation, and evaluate effects. (No refs.) - *J. King.*

574 NEMAN, RONALD, CLELAND, CHARLES C., & SWARTZ, JON D. Marketing practices and institutional services. *Training School Bulletin*, 65(2):71-76, 1968.

Borrowing the marketing practice of novelty from the commercial world, administrators can use the hedonic method of scheduling institutional services to benefit MR resident patients and staff personnel. In a study of work deprivation and motivation, 15 long-term, male MRs were placed on a 2-week hedonic schedule. The schedule was based on the stated preferences of each patient and involved novelty in the forms of simultaneous variety, successive variety, surprises, and prizes. New, fresh events and prizes were responded to enthusiastically by patients. Hedonic novelty also can be applied to food services, recreation, and quarantine problems. Chronically underweight patients responded to non-institutional food, weight gain contests, and cookouts by gaining an average of 7.1 pounds in 13 days. Variety in activity can avert frustration from quarantine boredom. Patients obtained enduring delight from pictures of themselves and tape recordings of their voices. The key to the hedonic method is in viewing the MR patient as a consumer and tailoring a program of novelty to the needs of the specific group it will serve. (10 refs.) - *S.L. Markworth.*

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575 KING, ROY D., & RAYNES, NORMA V. An operational measure of inmate management in residential institutions. *Social Science and Medicine*, 2(1):41-53, 1968.

A comparative study of the nature and determinants of patterns of care provided in institutions for children used the Inmate Management Scale, a 16-item sociological scale, to measure management practices in 2 group-cottage homes and 2 hospitals for children. The majority of children were long term care patients. Institutions were broadly comparable in terms of overall size, age, and sex composition. Large between-establishment differences existed in the mental and physical handicaps of inmates, but certain units in each hospital were comparable. Striking differences

were found in inmate management scores among the 4 institutions. The scores of the 2 homes indicated a high level of inmate oriented practice. Scores of the subnormality hospital showed a high level of institutionally oriented practice, while those of the pediatric hospital fell into an intermediate position on the scale. A replication study in 2 establishments served as a retest and tended to substantiate the proposition that differences in management are not engendered by differences in the presenting problems of the inmates. (7 refs.) - *B. Parker.*

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576 CRAFT, MICHAEL. Life for the handicapped child. *Mental Health*, (Spring):34-36, 1968.

A 25-bed residential school was set up in North Wales to treat multiply handicapped, educationally subnormal children. A staff of 1 part-time speech therapist, 3 full-time teachers, a part-time psychiatrist, a general hospital orthopedic surgeon and physiotherapist, an eye, ear, nose, and throat surgeon and psychoaudiometrician, local medical and dental officers, and 11 nurses makes up a 1 to 1 staff:child ratio. At the end of the first 2 years all children gained 2 mental years on the Vineland Scale of Social Ability. Of the 25 children presently at the school, all will be able to return home, 14 (56%) will be able to work in sheltered employment, and 11 (44%) will be able to go to senior training centers. It is estimated that there will be a need for 70 residential schooling places for this type of child and 70 beds for severely subnormal children in a population of 700,000. However, it is expected that, with proper care, many of the severely subnormal can become ambulant and trained for some self care. (No refs.) - *E.F. MacGregor.*

No address

577 REEDY, DON. Administering audio-visual techniques at Parsons State Hospital and Training Center. *Project News* (The Parsons State Hospital and Training Center), 4(2):1-3, 1968.

The Audio-Visual Department at Parsons State Hospital produces films and closed-circuit television programs which are used to educate lay audiences about the treatment, research, and community service aspects of MR; to inform professionals about the hospital's psychology and vocational education programs; and to record actual clinical procedures. The department requires a large, trained staff which includes cameramen, equipment operators, artists, writers, cinematographers, and engineers. Prior to actual production, the department must inform other disciplines about the capabilities and requirements of the audio-visual staff, establish an advisory committee to analyze and approve scripts, and set up a distribution agency. (No refs.) - *C. Rowan.*

Parsons State Hospital and Training Center
Parsons, Kansas 67357

578 THOMPSON, LARRY. Audio-visual media production problems. *Project News* (The Parsons State Hospital and Training Center), 4(2):4-6, 1968.

The production of film, video-tape, or closed-circuit television presentations as part of a training program in MR requires a completely manned and trained staff, proper equipment, adaptation to environmental needs, and extensive pre-production planning with regard to budget, purpose, script, and policy determination. The success of a project depends largely on communication, cooperation, and mutual respect between the Audio-Visual Department and the department or specialty requesting the production. (No refs.) - *C. Rowan.*

Parsons State Hospital and Training Center
Parsons, Kansas 67357

PROGRAMMATIC ASPECTS—RECREATIONAL

579 STERNBERG, ROBERT A. Organization of camping programs for the mentally retarded. In: *Selected Convention Papers: 46th Annual International Convention*, held New York, New York, April 14-20, 1968. Washington, D.C., Council for Exceptional Children, p. 251-253.

Good safety precautions and accurate selection of campers are essential to the effective functioning of a day camp for exceptional children. Safety precautions should include medical permission, early screening, and the determination of all medications. The camp should have adequate liability insurance. Personnel experienced with exceptional children are most useful. In-the-home screening of applicants is generally more effective than traditional psychological, medical, or educational measures. Important criteria for selection should be based on the child's locomotion, communication, and self-care skills. Grouping should consider these variables as well as physical size and coordination. For most purposes, a ratio of 3 counselors to 10 campers is sufficient, however, for children with severe communication disorders, 5 counselors are recommended. (No refs.) - *J.M. Gardner.*

Camp Jimmy
Randallstown, Maryland 21133

580 BERRYMAN, DORIS L. Unemployed young adults: A manpower resource for therapeutic recreation. *Journal of Rehabilitation*, 34(2):11-13, 1968.

Seventy-five unemployed young adults (mean CA 22 yrs) were experimentally trained as nonprofessional assistants in recreation programs for mentally and physically handicapped persons. The 6-month training demonstration, conducted by Comeback, Inc.(New York City), aimed at developing skills and at finding or establishing jobs. The program consisted of 3 months of orientation and skill training followed by 3 months of on-the-job training. There were 59 women and 16 men in the training group, 45 of whom were high school graduates. Classroom atmosphere was avoided by use of group discussion and role playing. Many teaching consultants were used to prepare the trainees to adjust to varied personalities. Although Ss' verbal expression was lacking, many were stimulated to do extra library reading on MR. Skill training broadened their knowledge of sports, dances and musical and dramatical activities. On-the-job training was conducted at hospitals, community centers and private and public training schools for retarded children. Of the 85% who completed training, 58% became employed and 14% remained unemployed. The others became homemakers, college or vocational students, or military draftees. The training program was discontinued because of the lack of a civil service career ladder for recreation personnel and because recreation professionals could not agree on the aides' role. The program budget should have allowed for intake physical examinations and emergency psychiatric help for trainees. (No refs.) - *S.L. Markworth.*

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581 AMERICAN ASSOCIATION FOR HEALTH, PHYSICAL EDUCATION, AND RECREATION AND NATIONAL RECREATION AND PARK ASSOCIATION. *Physical Education and Recreation for Handicapped Children: A Study Conference on Research and Demonstration Needs—Preliminary Report.* (Project No. 182-704). U.S. Office of Education, Bureau of Education for the Handicapped, Washington, D.C., May, 1969, 24 p. (Price unknown).

A conference of physical educators and recreation specialists considered the immediate and future needs for research and demonstration projects in physical education and recreation for the handicapped. Expert discussion groups made preliminary recommendations and encouraged closer cooperation between those dealing in services and those interested in theory. More effort must be placed on the development of measuring devices to assess the needs and evaluate the progress of MR and physically handicapped individuals. Elements of the mass media must be utilized to gain the understanding and support of both the professional and lay public of the problems and potentials of these patients. State and local legislatures should be encouraged to appropriate funds for the physical education of the handicapped. More volunteer and professional help must be recruited and trained. Research and demonstration projects should be developed to provide both general direction and specific information to improve direct services. (No refs.) - *E.L. Rowan.*

582 BARNETT, MARIAN WELLER. *Handicapped Girls & Girl Scouting: A Guide for Leaders.* New York, New York, Girl Scouts of the United States of America, 1968, 94 p. $2.00.

Because of the tremendous increase in Girl Scout membership among MR girls in the 1950s and 1960s, Girl Scout leaders need to understand MRs and the ways in which they learn. Both EMRs and TMRs participate in scouting. Moderately MR girls seem to function quite well in a Girl Scout troop. It is sometimes difficult to evaluate the value of scouting for TMRs. Although most MR girl scouts belong to troops for MRs, the wisdom of this isolation is currently being questioned. Leaders of MRs should have a positive approach; have expectations in line with each girl's capabilities; make allowances for short attention span and distractibility; have short-range, realistic, obtainable goals; be concrete; teach in terms of the girls' experiences; provide specific step-by-step directions; be sure the girls understand instructions; help the girls to develop social skills; and remember that MR girls may need to be taught things that others learn by observation, deduction, or simple experience. The main factor in making decisions about whether or not an MR girl can attend camp with nonhandicapped girls is social adjustment. Activities should be adapted to suit the abilities and limitations of the individual girl scout. This may mean that the method must be changed or that the activity must be modified. Some handicapped girls will not be able to earn some badges and these should be identified and eliminated. This book should be of interest to Girl Scout personnel and recreation leaders. (3 refs.) - *J.K. Wyatt.*

CONTENTS: Girls and Leaders; Troop Placement and Organization; Visual Impairment; Hearing Impairment; Orthopedic Problems and Cerebral Palsy; Cardiac Problems; Diabetes; Epilepsy; Mental Retardation; Emotional Disturbances; Adaptation of Activities; and Camping.

FAMILY

583 ATTWELL, ARTHUR A., & CLABBY, D. ANN. *The Retarded Child: Answers to Questions Parents Ask.* Burbank, California, Eire Press, 1969, 158 p. $3.95.

This resource manual provides brief, practical answers to questions most frequently asked by parents of MR children. Principles included are of particular reference to the SMR; however, they may be adapted to all levels of MR. Areas considered include the definition of MR; the etiology of MR; scientific diagnosis; prognosis; intelligence and intelligence tests; family relationships; speech problems; schooling, institutionalization, and vocational planning; sex education; and parent organizations. A glossary provides definitions of terminology associated with MR. This book should be of interest to parents of MRs, teachers and administrators in schools for MR children, legislators, and social workers. (No refs.) - *J.K. Wyatt.*

CONTENTS: What is Mental Retardation? The Why of Mental Retardation; Diagnosis and Referral; The M.A. and the I.Q.; Family Relationships: Problems and Adjustments; Family Relationships: The Child; Speech; Schooling; Parent Organizations; Sex Education; Institutionalization; and Vocational Planning.

584 NATIONAL INSTITUTE OF CHILD HEALTH AND HUMAN DEVELOPMENT. *The Social Sciences and Mental Retardation: Family Components.* Report of a conference held at Bethesda, Maryland, January 8-9, 1968. Washington, D.C., Public Health Service, 1968, 41 p. (Price unknown).

The papers in this summary report of a conference on the sociological dimensions of MR are concerned with sociological aspects of MR; the specific research potential of MR; and with research findings on the family components of MR, the family relationships of institutionalized and noninstitutionalized MR children, and the relationship of family theory to MR. In American society, MR may be the core, cause, or consequence of basic social dysfunction. Basic family types in which MR may be a key factor include those families in which there is a marked disparity between the intellectual level of normal parents and that of an organically damaged child and those families in which the parents of a neurologically intact, functionally borderline, MR child are socially disadvantaged, undereducated, and often intellectually limited. The differences between these family types are of such significance that failure to make a distinction between them can seriously distort understandings of the problems of MR. Possible research questions formed at this conference proposed the investigation of the relationship between MR and self concept formation; family relationships and child rearing patterns; socialization processes; social systems, networks, and institutions; patterns of care, treatment and development; special values, attitudes, and expectations; status and roles; parental reactions and coping strategies; and social-environmental factors in etiology. These papers should be of interest to sociologists and to those who feel that the social sciences should receive more emphasis in MR research. (31 refs.) - *J.K. Wyatt.*

CONTENTS: Conference Background and Purposes; Family Research in MR; Mental Retardation Research; Some Possible Research Questions; and Future Action.

585 RICHARDSON, STEPHEN A. Family components in mental retardation—some findings. In: National Institute of Child Health and Human Development. *The Social Sciences and Mental Retardation: Family Components.* Report of a conference held at Bethesda, Maryland, January 8-9, 1968. Washington, D.C., Public Health Service, 1968, p. 4-13.

To investigate the relative contribution of social/environmental factors and physiological insult to the causes of handicapping, a clear definition of MR and data on its true prevalence is needed. A study of 9,000 children (CA 8-10 yrs) in Aberdeen, Scotland revealed an estimated overall incidence of MR of 28.2/1,000. Of this number 12.6/1,000 had been identified as MR by both health and educational authorities and placed in special educational or institutional facilities. An additional 15.6/1,000, the "iceberg" group had IQs below 75 but had not been assigned to special facilities. The overall prevalence of MR was 10 times greater among children from the lowest social class than among upper class children. Incidence of SMR was constant across all social classes. Incidence of mild MR increased from 0/1,000 in the upper class to 24.9/1,000 in the lowest class. Prevalence of moderate MR involving CNS damage among children in special facilities was random across social classes I through IV. However, in social class V, the lowest group, there were 7 times as many cases as in any other social class group. Studies are needed which will examine the school performance and neurological status of the "iceberg" group, and establish the range of function of SMR children with CNS damage. The effect of an MR child on family planning appears to be related to age of the child when MR is identified, type of MR, ordinal position, and economic and physical resources of the family. Research findings

on the manipulation of the environment to diminish deficits of MR and upgrade individual intellectual performance have promising implications for future research and services. (No refs.) - *J.K. Wyatt.*

586 FARBER, BERNARD. Family relationships of institutionalized and non-institutionalized retarded children. In: National Institute of Child Health and Human Development. *The Social Sciences and Mental Retardation: Family Components.* Report of a conference held at Bethesda, Maryland, January 8-9, 1968. Washington, D.C., Public Health Service, 1968, p. 13-15.

Studies of families of MR children reveal differences in religious affiliation and social class between those families who institutionalized their children and those who did not. Protestants were most likely to institutionalize MR children, Catholics were next, and Jewish families were least likely to do so. There was a greater tendency toward institutionalization among working class families than among upper class families. Data on the effects of an MR child on siblings indicate that girls with MR siblings living at home evidenced more personality problems than girls with institutionalized MR siblings, and that the life goals of siblings who had a high level of interaction with MR siblings were serious and altruistic, while those of siblings who had a low level of interaction with MR siblings were of a social-emotional nature. MR children, particularly sons, seemed to have a greater and more lasting impact on fathers than on mothers. Middle class mothers had a greater tendency than lower class mothers to react to information concerning MR in a child by going to pieces. Rate of institutionalization appeared to be reduced in areas where special education programs were available for EMRs, and the relationship between the mother of an MR child and her own siblings appeared to be related to progress in special education classes. (No refs.) - *J.K. Wyatt.*

587 TALLMAN, IRVING. Family theory as it relates to mental retardation. In: National Institute of Child Health and Human Development. *The Social Sciences and Mental Retardation: Family Components.* Report of a conference held at Bethesda, Maryland, January 8-9, 1968. Washington, D.C., Public Health Service, 1968, p. 15-21.

Principle aspects of family theory which relate to MR are the impact of MR on the family and the ways in which the family copes with MR. The family must be viewed as an institution, a social organization, and a small group of interacting personalities. Assessment of the impact of MR on the family requires consideration of the meanings of MR, variation in meanings in different subcultures and with different types and degrees of MR, and alteration of meanings which have been affected by social change. To evaluate the ways in which families cope with MR, the effects of MR on family organization, role allocation, the roles of an MR child, division of labor, family goals, and family internal and external resources must be considered. In an urbanized, industrialized society, the family functions to prepare children to carry on the business of society. Since the family of an MR child is deviant in that it cannot fulfill this function, identification of the degree of family acceptance given it by the subcultures within the society is critical. This acceptance appears to be related to factors such as subculture values, family goals, direction of social emphasis concerning MR, social position, and differing religious beliefs. Family areas which need additional study include the affectional coalitions within families; the effects of a crisis situation on family life; and family size, ordinal position, power structure, communication patterns, levels of communication, and social network. (No refs.) - *J.K. Wyatt.*

588 ROTHENBERG, MICHAEL B., & SILLS, EDWARD M. Iatrogenesis: The PKU anxiety syndrome. *Journal of the American Academy of Child Psychiatry*, 7(4):689-692, 1968.

With the proliferation of laws requiring mass screening with the Guthrie test for phenylketonuria (PKU) before infants leave the hospital, the high incidence of false positive reactions has caused a great deal of anxiety among parents who equate a positive Guthrie test with MR in their child. The incidence of PKU is known to be approximately 1/10,000 to 25,000 live births but initial screening in New York City found 1 false positive in every 10 to 11 tests. By the third screening this had dropped to 1/200 as false positives were defined as normal phenylalanine levels and no clinical findings despite positive Guthrie tests. In an attempt to allay needless anxiety, the Bronx Municipal Hospital has avoided sending form letters notifying parents of an abnormal test and requesting a repeat examination and instead has warned mothers before they leave the hospital that the test is being performed and that many false positives are to be expected, and then supporting and reassuring parents of false positive infants until their anxiety is alleviated. If more feasible screening programs are prematurely introduced, other iatrogenic anxiety syndromes may be fostered. (14 refs.) - *E.L. Rowan.*

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589 D'ARCY, ELIZABETH. Congenital defects: Mothers' reactions to first information. *British Medical Journal*, 3(5621): 796-798, 1968.

The effects of congenital defects in babies and resultant mothers' reactions to this information are studied in terms of counseling techniques, time interval, and type of information given by medical staff. Ss were 694 English mothers who had a baby with congenital defect born during the 1960-1963 period. Semi-structured and informal interviews were completed in 1966-1967. Each mother was questioned about the way she was told of the defect, the duration of time until she was told, and the person giving the defect information. Abnormalities were classified according to type such as anencephaly or mongolism. Of 96 mothers who had an anencephalic baby, over 33% were critical of information procedures. One hundred and ninety-four mothers of spina bifida babies were satisfied with information procedures and with the fact that it was presented soon after the birth. The majority of mothers of mongoloids preferred to be told immediately. Mothers of children with cleft lips or palate appeared to be relieved by photographs of

improved appearance after surgery. About 75% of 194 babies with congenital heart disease were satisfied with information and type of presentation. Desirable information factors were: a sympathetic approach by medical and nursing staff, the use of simple language, recognition of the mother's need for questioning, and presentation of truth and objectivity about the child rather than undue optimism or pessimism. (3 refs.) - *B. Bradley.*

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590 JOHNSON, BETTY, & MORSE, HAROLD A. Injured children and their parents. *Children*, 15(4):147-152, 1968.

The purpose of a study of 85 families in which 1 or more children had been physically abused by parents was to identify parent and child characteristics. Injuries in 101 child abuse cases were classified, and both parents and child were examined. Seventy percent of the children evidenced physical or developmental deviation prior to the report of the injury. Emotional deprivation was prevalent and the children were generally deprived of parental care, love, and affection. In many cases parents abused children who were hyperactive, had a limited attention span, or presented behavior problems. Siblings of abused children were also abused. Incidence of abuse was higher among older children and middle children were least likely to be injured. General findings on parents indicated that they were incompetent, hostile, and anxious. Marital discord, poor economic conditions, and lack of adequate housing and employment were apparent. Many parents had experienced deprivation and defective parental care in their own childhood. Family relationships were often nonverbal and characterized by bickering, nagging, or berating. The approach of parent services was to recognize the parents as persons who, because of their own childhood experiences, were unable to love their own children and to offer to help relieve stress. Families were seen weekly or every other week and Child Welfare workers were available for emergencies. Parents were resistant, evasive, and found it difficult to accept help. At the end of the study 1/5 of the parents had improved, 1/3 had adequate mental health, and 62% of the families evidenced adequate home care. (No refs.) - *S. Half.*

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591 KARNES, MERLE B., STUDLEY, WILLIAM M., WRIGHT, WILLIS R., & HODGINS, AUDREY S. An approach for working with mothers of disadvantaged preschool children. *Merrill-Palmer Quarterly*, 14(2):174-184, 1968.

A training program for mothers of disadvantaged preschool children was evaluated to determine its effects on intellectual and language development. Ss included 30 Negro children (CA range 3 yrs 3 mos—4 yrs 3 mos) residing in a depressed economic environment who were not enrolled in a preschool program. The Stanford-Binet Intelligence Scale, 1960 (S—B) and the Illinois Test of Psycholinguistic Abilities (ITPA) were employed as indicators of intelligence and linguistic function. Ss were matched on IQ and sex and randomly assigned to experimental (E) (mean IQ 91.31) or control (C) (mean IQ 95.46) groups. Mothers were paid for attendance at 11 weekly, 2-hour sessions conducted by 3 experienced preschool teachers. Materials directed toward language development and basic manipulative skills were prepared at these meetings to be used in individual work at home with the children. Teachers made home visits to E group homes at 2-week intervals. Results showed significant gains (.05 level) for the E group on the S—B. ITPA findings indicated that the E group "exceeded their level of expectancy on 8 of the 9 subtests" and on total language score. The C group surpassed expected improvement for a 3-month period on only 3 subtests. Factors contributing to success of this training program were wages, the use of an activity training approach, teacher visits, and increased confidence of the mothers. (18 refs.) - *B. Bradley.*

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Urbana, Illinois 61801

592 GARDNER, RICHARD A. Psychogenic problems of brain-injured children and their parents. *Journal of the American Academy of Child Psychiatry*, 7(3):471-491, 1968.

Psychogenic problems arise both in brain-injured children and in their parents, but should be considered in terms of the complexity of interactions between parent and child and seen as amenable to therapeutic intervention. Acute reactions of adaptation in parents occur on learning of the child's brain injury and may take the form of denial, overprotection, anger, inappropriate guilt, or blame. These reactions are in part determined by parental personality but should in all cases be met with honesty by the physician who should encourage the parents to be similarly honest with themselves and with the world. Chronic parental reactions are more complex and masochistic-martyristic reactions, overprotective reactions, withdrawal reactions, and "doctor-shopping" in the service of denial often require intensive psychotherapy and the involvement of parents in community groups for alleviation. The child may be afraid, withdrawn, or regressed, utilize organic neurosis, clown or display low self-esteem. He should be made aware of the true nature of his condition and encouraged in appropriate areas. Parents must encourage their child to the limits of his capability while banding together in community action groups for mutual support, sublimation of anger, and education and assistance for themselves and their children. (11 refs.) - *E.L. Rowan.*

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New York, New York 10032

593 LUSZKI, WALTER A. Strictly for parents: Controlling the brain-damaged hyperactive child. *Journal of Learning Disabilities*, 1(11):672-680, 1968.

The brain-damaged child who is also hyperactive and, therefore, disruptive at home and school, may be controlled by thoughtful planning and discipline by

parents who prefer to retain the child at home rather than send him to an institution. Moderately to severely hyperactive children may show traits of aggression, restlessness, short attention span, and lack of fear. Many of them may have multiple handicaps. The basic principle in controlling their behavior is to reward desirable behaviors and punish undesirable ones. Recommendations include a seat belt at the child's desk, a padded "retreat" room in the home, and safe toys that cannot harm the child or his playmates. Restrictions should be introduced as special privileges. Play should combine solitary and group activities. The parent can help the child dissipate his energy by structuring action-oriented play such as making "musical" instruments out of discarded kitchen equipment, listening to records, pounding stakes with a rubber hammer, building sand castles, or making a tunnel out of large cartons. The child should also learn to do household chores. (11 refs) - *S. Markworth.*

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Charleston
South Carolina 29403

PERSONNEL

594 UNITED STATES HEALTH, EDUCATION, AND WELFARE DEPARTMENT. ***Career Opportunities in the Field of Mental Retardation.*** Washington, D.C., Superintendent of Documents, U.S. Government Printing Office, 1969, 23 p. $0.25.

Occupational information in the field of MR is divided into areas of health and related services, education, social and rehabilitative services, research, and administration and coordinated services. Each job description includes a discussion of the roles and responsibility of the position, specification of educational and training requirements, a description of available financial assistance, and sources of additional information. Careers for high school and college students and for persons with neither a formal education nor specialized training, which represent the great range and diversity of personnel needed to care for the MR, are included. Persons interested in working with the MR, guidance counselors, and educators should find this publication of interest. (10 refs.) - *J. King.*

595 NATIONAL ASSOCIATION FOR RETARDED CHILDREN. ***Careers in the Field of Mental Retardation.*** New York, New York, 1968, 36 p. (Price Unknown).

Data on 32 occupations in the field of MR include job descriptions, qualifications, sources of financial assistance (when available), and sources of additional information. A discussion of MR and a description of services which should be included in a comprehensive program for the MR are included. This publication should be of interest to students, educators, and guidance counselors. (No refs.) - *J.King.*

596 ARNHOFF, FRANKLYN N., RUBINSTEIN, ELI A., & SPEISMAN, JOSEPH C., eds. ***Manpower for Mental Health.*** Chicago, Illinois, Aldine, 1969, 204 p. $6.95.

In 1967, the National Institute of Mental Health sponsored a symposium on the provision of manpower for mental health programs. Existing manpower shortages are critical, yet participating behavioral and social scientists agreed that it will remain unchanged until a definitive approach to the prevention and treatment of mental illness is found. Research projects must be undertaken to quantify the effects of all programs, and inefficient and "nontherapeutic" programs must be terminated. The existing labor force which encompasses all professional disciplines and ancillary services must become more stable and effective. Government programs must assist in the development of new theoretical concepts and the practical application of these. This theoretical, multidisciplinary approach to the problems of manpower is of interest to physicians, administrators, and social scientists concerned with the provision of mental health services. (288 refs.) - *E.L. Rowan.*

CONTENTS: The Mental Health Fields: An Overview of Manpower Growth and Development; A Perspective on Manpower Theory and Conceptualization; The Politics of Mental Health Objectives and Manpower Assets; Economic Aspects of Mental Health Manpower; The Relation of Conceptual Models of Disturbed Behavior to Institutional and Manpower Requirements; Career Patterns: Trends and Prospects; Individual Motivation and Personal Factors in Career Choice; The New Mental Health Workers; and Utilization of Manpower in Provision of Mental Health Services.

597 EDGINGTON, HERBERT JOE. The administration and supervision of programs for the educable mentally retarded. *Dissertation Abstracts*, 29A(3):773, 1968.

A survey and analysis conducted in 18 California school districts with the largest numbers of EMR minors investigated patterns of administration pertaining to the MR, conflicting philosophies and precepts of personnel in the special education program, and the interaction between personnel responsible for the program. Results indicated that 9 of the school districts had a specific philosophy in regard to the EMR, 12 did not open classes for the EMR until maximum numbers were reached, and 16 had organizational charts which specified roles and responsibilities. There were widely divergent opinions in critical problem areas among school personnel, tendencies for personnel to hold dissimilar concepts of others' roles, and a belief that common sets of problems were unique. Specific patterns of problems were identified and these patterns were not affected by administrative organization. (No refs.) - *J. King.*

No address

598 SPARER, LOUIS. A study of role relations in a state hospital for mental defectives. *Dissertation Abstracts*, 28A(10):4235, 1968.

A study of the nature of role perceptions in cross disciplinary team work at the Pacific State Hospital revealed that role functions tended to be differentially perceived even in professions in close contact with each other, and that groups closest together in the status hierarchy were more sensitive to encroachment from each other than from groups at other status levels. Individual interviews, a ranking of hospital task functions, and a selection task were used to obtain data from 10 psychiatrists, 10 clinical psychologists, 10 psychiatric social workers, 10 registered nurses, and 10 ward charges. (No refs.) - *J. King.*

599 MERCER, VICTOR H., & GISH, CHARLES W. Continuing role of the Indiana State Dental Association in the improvement of dental programs in state institutions. *Journal of Public Health Dentistry*, 28(1):2-4, 1968.

The Indiana State Dental Association and the Dental Division of the Indiana State Board of Health have worked together since 1960 to upgrade the dental programs of Indiana's mental, correctional, and special institutions. Yearly surveys, objective, practical, and specific recommendations, and follow-up consultations have resulted in a steady improvement in services. Increases in classification and salary to a level commensurate with private practice have attracted well-qualified, young, and enthusiastic dentists into institutions, and the Indiana Public Health Dentists' Organization has been instrumental in establishing standards of institutional practice and policies. The continued interest and cooperation of organized dentistry is essential if high standards of care are to be maintained. (1 ref.) - *E.L. Rowan.*

Indiana State Board of Health
330 West Michigan Street
Indianapolis, Indiana 46207

600 ARRA, M.C. Report on continuing education program—Dentistry for handicapped children. *The Journal of the Wisconsin State Dental Society*, 44(7):199-227, 1968.

As part of the program of continuing professional education, three 4-day courses in "Dentistry for Handicapped Children" were presented to a total of 48 dentists and 3 dental hygienists from all areas of Wisconsin. Lectures and demonstrations dealt with special problems of the handicapped and appropriate office and hospital procedures. The need for such a program was emphasized by survey results indicating a general interest throughout the state and an initial over-subscription for the course. Techniques for dealing with patients with MR and other handicaps should become part of the dental school curriculum and plans for providing such services should be included in the state health care program. (No refs.) - *E.L. Rowan.*

No address

601 HERZKA, HEINZ S. Die arztlichen Aufgaben bei der Rehabilitation schwer geistig behinderter Kinder im Ausbildungsheim (The doctor's area of responsibility in the rehabilitation of the severely mentally retarded in a training center). *Praxis*, 57(39):1338-1343, 1968.

The physician who works with the SMR has 2 main areas of responsibility: treatment of the child and consultation with the staff and members of the family. He must determine the etiology of the retardation and set up a plan of treatment. The child should be exposed to varying sensory experiences, as his ability to explore on his own is limited. Possible neurosensory defects should be diagnosed and corrected. Any behavioral abnormalities may be treated with psychopharmaceutical drugs, but care must be exercised that this does not decrease learning potential. In consultations with parents, the physician seeks to allay feelings of guilt and to present a realistic evaluation of the situation. In consultation with other staff members, the physician seeks to clarify issues such as organization and treatment of the children. He may also encourage discussion of difficult situations which staff members have encountered. In the future, an increased effort should be made to recruit and train physicians, nurses, and other specialized personnel for this area. (9 refs.) - *S.L. Hamersley.*

Psychiatrische Poliklinik fur
Kinder und Jugendliche
Freiestrasse 15
Zurich, Switzerland CH 8028

602 COTTER, MARY DOLORA. The public health nurse and community mental health. *Nursing Outlook*, 16(4):59-61, 1968.

The responsibilities of the public health nurse who is a member of the community mental health center team vary with needs and include early casefinding, appropriate referral, home visits, follow-up care, and serving as a community consultant and a resource in community education. She must have a wholesome self-concept, emotional stability, flexibility, and personal insight if she is to function productively with

patients, families, and community agencies. Comprehensive orientation, continued inservice training, and utilization of a variety of educational opportunities will enhance the professional development of the public health nurse in the field of mental health and enable her to provide a higher level of patient care. (3 refs.) - *S. Half.*

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Grand Junction, Colorado 81501

603 USHER, ELIZABETH C., & SLORACH, NEIL. Some aspects of speech therapy. *Clearing House Journal*, 8(March): 29-34, 1968.

Since the speech therapist will be working with deaf, subnormal, slow maturing, and normal children and adults, it is important that she be a member of a rehabilitation or habilitation team. Speech involves the whole personality and speech therapy requires cooperation with the physician, psychologist, teacher, social worker, and neurologist. The therapist uses the techniques of the linguist when stimulating language development; those of phonetician when working with sounds; those of the physician when observing changes in health; those of the teacher when teaching words; and those of the psychologist when making therapy decisions based on the child's abilities and needs. Rapport between therapist and patient is an important psychological factor in treatment. Speech and language problems include those of stammering, cleft palate, faulty articulation, aphasia, delayed language development, vocal disorders, and post-laryngectomy. (No refs.) - *G. Trakas.*

University of Queensland
Queensland, Australia

604 KOKASKA, CHARLES J., ed. *Selected Speeches from a Workshop for Aides to Teachers of the Trainable Mentally Retarded.* Lansing, Michigan, Department of Education, 1969, 39 p. (Price unknown).

The purpose of a Michigan workshop for aides to teachers of TMRs was to expose aides working in community programs and institutional settings to the personnel involved in state programs for TMRs, and to provide instructional activities in the form of lectures and demonstrations of teaching techniques and audiovisual aids. Teacher's aides can be used in special education to assume numerous teacher responsibilities unrelated to the instructional role. Their role depends on its interpretation by supervisory personnel and on the situational needs of each program. The teacher and the aide should work as a team. Aides need to be aware of group teaching methods, pupil management techniques, the importance of language in the development of TMR children, the relationship they are expected to have with parents, and opportunities available to TMRs when they leave school. The speeches presented at this workshop should be of interest to educators, special educators and special education teacher aides. (No refs.) - *J.K. Wyatt.*

CONTENTS: Introduction (Kokaska); Group Teaching of Trainable Retarded Children (Lill); Trainable Pupil Management (Harris); Communication Skills for the Trainable Retardate (Chance); The Aide's Relationship with Parents in Programs for Trainable Mentally Retarded (Anderson); Where Do They Go from Here? (Baxter).

605 ANDERSON, ETHEL M. The aide's relationship with parents in programs for trainable mentally retarded. In: Kokaska, Charles J., ed. *Selected Speeches from a Workshop for Aides to Teachers of the Trainable Mentally Retarded.* Lansing, Michigan, Department of Education, 1969, p. 25-26.

Teacher-aides should adopt a friendly, cordial attitude toward the mothers of TMR children and should assist them in obtaining information. Since mothers of TMRs are often apprehensive about their children's acceptance, the cordial attitude of an aide is important to them. The aide should focus on giving help to the teachers and, should never put herself between a parent and a teacher, or adopt an advisory role with a parent. The teacher and aide should work as a team in which each respects the other's position and loyalty to the program. (No refs.) - *J.K. Wyatt.*

606 CRUICKSHANK, WILLIAM M., JUNKALA, JOHN B., & PAUL, JAMES L. *The Preparation of Teachers of Brain-Injured Children.* Syracuse, New York, Syracuse University Press, 1968, 203 p. $6.50.

The curriculum of a 1-year master's degree at Syracuse University for teachers of brain-injured children included course work in the philosophy of education, statistics of educational measurement, child or adolescent psychology, the psychology of disabilities, the education of emotionally disturbed children, the diagnosis and treatment of reading and arithmetic problems, and the education of brain-injured and hyperactive children. The program's philosophical orientation stressed a structured approach, the concept of contiguous conditioning, and detailed analysis of each child's psycho-educational deficits. Major focus was on a seminar in the education of brain-injured and hyperactive children. Seminar content included psychopathology, teaching methods and materials, problems of classroom management, presentations by coordinating consultants representing a variety of related disciplines, and participation in a variety of activities with brain-injured and hyperactive children. Both teachers and administrators from their school systems attended a 7-day administrator's seminar aimed at developing a good understanding of the program and its application to the school. One MR child was included in the demonstration class which served as a focal point for seminar discussions so that the applicability of the program's procedures to MRs could be demonstrated. Follow-up studies on 47 teachers who participated in the program over a 4-year period revealed that 75 % were employed either as teachers of brain-injured children or as program administrators. This book should be of interest to educators, special educators and curriculum personnel. (74 refs.) - *J.K. Wyatt.*

CONTENTS: A Plan for Teacher Education; Evaluation; Barriers to Innovation; and After Training, Then What?

607 JONES, REGINALD L. Morale of teachers of mentally retarded children: An exploratory investigation. Ohio State University Mental Retardation Training Program Technical Report Series 68-3, Columbus, Ohio. Ohio State University, 1968, 15 p.

The Purdue Teacher Questionnaire (PTQ was used to compare job satisfaction in regular teachers and teachers of the MR at elementary and secondary levels. The PTQ is a factor analytically based questionnaire containing 11 sub-tests related to job satisfaction. At the elementary level, 20 male and 93 female regular teachers were compared with 11 male and 39 female EMR teachers of similar age and teaching experience. No significant differences were found. Nineteen female TMR teachers perceived themselves as lower in status than regular elementary teachers. At the secondary level, 47 female regular teachers in comparison with 14 female EMR teachers saw themselves as having greater colleague rapport, and were more satisfied with salary, curriculum issues, and teacher status. Total morale was higher for regular teachers ($t = 2.55$, p .02). Male secondary EMR teachers tended to perceive greater rapport with their colleagues than regular teachers. No significant differences were found for special teachers employed in special or regular schools. In 1 sample of female TMR teachers, not having a special education colleague was associated with higher morale and rapport with the principal. This finding was contrary to predictions. (5 refs.). - *J.M. Gardner.*

Mental Retardation Training Program
1800 Cannon Drive
Columbus, Ohio 43210

608 McBRIDE, DON W., GILMORE, DOUGLAS, & HAMMILL, DONALD D. Predictive factors in the success of classroom teachers of the multihandicapped. *Cerebral Palsy Journal*, 29(4):6-8, 1968.

Fifty-eight special education teachers were rated by at least 3 supervisors on 7 traits considered necessary for teacher success. Average scores were correlated with teacher age, years of experience prior to employment, amount of college training, and field of specialization in college. All correlations were positive, but all were insignificant except for amount of experience prior to employment and rated teacher success. These findings indicate that years of experience appear to be a predictive factor for successful teaching, up to and beyond 8 years (14% of the sample had 8 or more years of experience). (12 refs.) - *M.G. Conant.*

Institute of Logopedics
Wichita State University
Wichita, Kansas 67200

609 ABLEWHITE, R.C. *Training to Teach the Backward Child: Guide Lines for Teachers: No. 1.* London, England, Guild of Teachers of Backward Children, 1968, 10 p. $0.18.

Special educational treatment, guaranteed to every British child by the Education Act 1944, must be made available to children who demonstrate educational backwardness. This includes "slow-learning," MR, culturally deprived, emotionally disturbed, and physically handicapped children whose disability is not severe enough to make schoolwork impossible. Ninety percent of the EMR children attend ordinary primary and secondary schools and respond well to special educational treatment. Although no specialist qualifications are required to teach EMR children, a college course in the teaching of the handicapped, personal qualities of patience, imagination and good rapport with children, and previous experience teaching normal children are helpful to teachers. Financial rewards, personal satisfaction, and association with colleagues accrue from this challenging field. (No refs.) - *C. Rowan.*

610 CROWLEY, REGIS F. Teaching the slow learner. *Today's Education*, 58(1):48-49, 1969.

Practical and realistic teaching approaches should be used in the daily instruction of the slow learner to increase motivation to succeed, improve the self image, and help him gain in self confidence. Teachers must be aware of the slow learners' limited attention span, low tolerance and frustration level, and needs for recognition and achievement. It is important to obtain a comprehensive neurological, psychological, psychiatric, and psychosocial evaluation in order to understand why a child is a slow learner. Slow learners should know that the teacher really cares about and is interested in them. Teacher approaches which have been helpful in the instruction of slow learners include avoiding belligerence; dealing in concrete experiences; providing a variety of experiences; avoiding complacency and personality clashes; using understanding, patience, and encouragement to overcome frustration and resentment; and helping the child to set realistic future goals. (No refs.) - *S. Half.*

Western Branch Junior High School
Chesapeake, Virginia 23320

611 LITZINGER, WILLIAM D., REGAN, WILLIAM J., & VISSER, CORNELIS. The dilemma of workshop management. *Journal of Rehabilitation*, 34(2):20-23, 1968.

A comparison of workshop directors and business managers on 3 tests revealed that workshop directors were less structured, less goal-oriented, and less competitive. Twenty-two vocational rehabilitation workshop directors (mean CA 41 yrs) were tested for influence as a leader along the dimensions of structure and consideration on the Fleishman Leadership Opinion Questionnaire (FLOQ). The Gordon Survey of Interpersonal Values (GSIV) was used to assess support, conformity, recognition, independence, benevolence, and leadership values. The Miner Sentence Completion Scale (MSCS) was used to evaluate leadership motivation in the areas of authority figures, competitive games, competitive situations, masculine role, imposing wishes, standing out from group, and routine administrative function. Workshop directors equaled other managerial group scores for all items in the FLOQ and GSIV except structure and benevolence. They had lower scores for structure and higher scores for benevolence than other managerial groups. The MSCS

showed that workshop directors were significantly lower than other groups in competitive games and situations. The overall findings indicate that workshop directors were most like education administrators and least like sales managers. Future research should identify the desirable attitude mix for workshop directors, the workshop size for the best use of leadership, and the manpower source for directors. (4 refs.) - *S.L. Markworth.*

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PUBLICATIONS SCANNED

The following publications are scanned regularly for articles pertinent to mental retardation.

AAUP Bulletin
ACLD Items of Interest (Association for Children with Learning Disabilities)
ACT (American College Testing) Program Research Reports
AIA (Architectural Institute of America)
ALA Bulletin (American Library Association)
AMS Bulletin (American Montessori Society)
ASHA: A Journal of the American Speech and Hearing Association
ATA Magazine
ATA News (Alberta Teachers Association)
AV (Audio-Visual) Communication Review
About Education
Abstracts for Social Workers
Academic Therapy
Acta Anatomica
Acta Biologiae Experimentalis
Acta Chirurgiae Plasticae
Acta Endocrinologica
Acta Geneticae Medicae et Gemellologiae
Acta Haematologica
Acta Medica Scandinavica
Acta Morphologica
Acta Neurochirurgica
Acta Neurologica et Psychiatrica Belgica
Acta Neurologica Scandinavica
Acta Neuropathologica
Acta Obstetricia et Gynecologia Scandinavica
Acta Ophthalmologica
Acta Oto-Laryngologica
Acta Paediatrica Belgica
Acta Paediatrica Scandinavica
Acta Paedopsychiatrica
Acta Pathologica et Microbiologica Scandinavica
Acta Physiologica Latino Americana
Acta Physiologica Polonica
Acta Psiquiatrica y Psicologica de America Latina
Acta Psychiatrica Scandinavica
Acta Psychologica, Amsterdam
Acta Sociologica
Activitas Nervosa Superior
Administrative Science Quarterly
Administrator's Notebook
Adolescence
Adult Education
Adult Education News
Adult Leadership
Aerospace Medicine
Aerzliche Forschung
Agricultural Education Magazine
Alabama School Journal
Alabama State Teachers Association Journal
Alaska Teacher
Alberta Journal of Educational Research
Alberta Psychologist
Alma Mater
Alpha Delta Kappan
Amentia
America Latina, Brazil
American Annals of the Deaf
American Anthropologist
American Association for Health, Physical Education, and Recreation Research Quarterly
American Association of Colleges for Teacher Education Yearbook
American Association of School Administrators Official Report
American Behavioral Scientist
American Biology Teacher
American Child
American Corrective Therapy Journal
American Council on Industrial Arts Teacher Education Yearbook
American Ecclesiastical Review
American Education
American Educational Research Journal
American Foundation for the Blind, Research Bulletin
American Heart Journal
American Institute of Architects Journal
American Journal of Cardiology
American Journal of Clinical Hypnosis
American Journal of Clinical Pathology
American Journal of Correction
American Journal of Digestive Diseases
American Journal of Diseases of Children
American Journal of Economics and Sociology
American Journal of Epidemiology
American Journal of Hospital Pharmacy
American Journal of Human Genetics
American Journal of Medical Sciences
American Journal of Medicine
American Journal of Mental Deficiency
American Journal of Nursing
American Journal of Obstetrics and Gynecology
American Journal of Occupational Therapy
American Journal of Ophthalmology
American Journal of Optometry and Archives of American Academy of Optometry
American Journal of Orthodontics
American Journal of Orthopsychiatry
American Journal of Pathology
American Journal of Physical Medicine
American Journal of Physiology
American Journal of Proctology
American Journal of Psychiatry
American Journal of Psychoanalysis
American Journal of Psychology
American Journal of Psychotherapy
American Journal of Public Health
American Journal of Roentgenology
American Journal of Roentgenology, Radium Therapy, and Nuclear Medicine
American Journal of Sociology
American Journal of Surgery
American Journal of Tropical Medicine and Hygiene
American Music Teacher
American Psychologist
American Quarterly
American Review of Respiratory Diseases

American School and University
American School Board Journal
American School News
American Sociological Review
American Sociologist
American Surgeon
American Teacher
American Teacher Magazine
American Vocational Journal
Anaesthesia
Analyse et Prevision, France
Anatomical Record
Andover Newton Quarterly
Anesthesia and Analgesia: Current Researches
Anesthesia Progress
Anesthesiology
Angiology
Anglican Theological Review
Animal Behavior
Annales d'Endocrinologie
Annales de Genetique
Annales de Pediatrie
Annales Medico-Psychologiques
Annales Paediatriae Fenniae
Annali Sociologia, Italy
Annals Institute de Pasteur, Paris
Annals of Allergy
Annals of Human Genetics
Annals of Internal Medicine
Annals of Rheumatic Diseases
Annals of Surgery
Annals of the New York Academy of Sciences
Annals of Thoracic Surgery
Annee Psychologique
Annual of Animal Psychology, Tokyo
Annual Review of Psychology
Antibiotiki
Antioch Review
Aportes
Applied Social Studies
Architects' Exchange
Architectural Forum
Architectural Record
Architectural Review
Archives Francaises de Pediatrie
Archives Italiennes de Biologie
Archives of Biochemistry and Biophysics
Archives of Dermatology
Archives of Disease in Childhood
Archives of Environmental Health
Archives of General Psychiatry
Archives of Internal Medicine
Archives of Neurology
Archives of Ophthalmology
Archives of Otolaryngology
Archives of Pathology
Archives of Physical Medicine
Archives of Surgery
Archiv fur die gesamte Psychologie
Archiv fur Geschwulstforschung
Archiv fur Kinderheilkunde
Archiv fur Klinische und Experimentelle Ohren-Nasen-und Kehlkopfheilkunde
Archiv fur Psychiatrie und Nervenkrankheiten
Archivio di Psicologia, Neurologia e Psichiatria
Archivos de Crimonologia, Neuropsiquiatria y Disciplinas Conexas
Arhiv za Higijenu Radu i Toksikologiju
Arithmetic Teacher
Arizona Teacher
Arquivos de Neuro-Psiquiatria
Art Education
Arthritis and Rheumatism
Art Quarterly
Arts and Activities
Association for Student Teaching Yearbook
Association for Supervision and Curriculum Development Yearbook
Athletic Journal
Audiovisual Instruction
Audio-Visual Language Journal
Audio-Visual Media
Australasian Annals of Medicine
Australian Children Limited
Australian Journal of Adult Education
Australian Journal of Education
Australian Journal of Experimental Biology and Medical Science
Australian Journal of Psychology
Australian Journal of Social Issues
Australian Outlook
Australian Paediatric Journal

BINOP: Bulletin de l'Institut National d'Etude du Travail et d'Orientation Professionnelle
Balance Sheet
Behavior
Behavioral Science
Behavior Research Methods and Instrumentation
Behaviour Research and Therapy
Bien-Etre Social Canadien
Bildung und Erziehung
Biochemical and Biophysical Research Communications
Biochemical Genetics
Biochemical Journal
Biochemical Medicine
Biochemistry
Biochimica et Biophysica Acta, Amsterdam
Biofizika
Biologia Neonatorum
Biomedical Engineering, London
Biometrics
Birth Defects Original Article Series
Blood
Blut
Boletin Informativo (Instituto Nacional de Psiquiatria Infantil)
Boletin Informativo del Instituto Neurologico de Guatemala
Bollettino di Psicologia Applicata
Brain
Brain, Behavior and Evolution
Brain Research
British Heart Journal
British Journal for the Philosophy of Science
British Journal of Clinical Practice
British Journal of Criminology
British Journal of Dermatology
British Journal of Educational Psychology
British Journal of Educational Studies
British Journal of Industrial Medicine
British Journal of Mathematical and Statistical Psychology
British Journal of Medical Psychology
British Journal of Ophthalmology
British Journal of Pharmacology
British Journal of Preventive and Social Medicine
British Journal of Psychiatric Social Work
British Journal of Psychiatry
British Journal of Psychology
British Journal of Radiology
British Journal of Social and Clinical Psychology
British Journal of Sociology
British Journal of Surgery
British Medical Journal
Broadcaster (Newsletter of the Beatrice State Home, Beatrice, Nebraska)
Bulgarska Akademiya Na Naukite
Bulletin (Council of Social and Psychological Research, Calcutta)
Bulletin de l'Association Internationale de Psychologie Appliquee
Bulletin de Psychologie Scolaire et de'Orientation
Bulletin des Ecoles Primaires
Bulletin du C.E.R.P.
Bulletin of Art Therapy
Bulletin of Suicidology
Bulletin of the Atomic Scientists
Bulletin of the British Psychological Society
Bulletin of the Dental Guidance Council for Cerebral Palsy
Bulletin of the Department of Education (Massachusetts)
Bulletin of the Institute of Child Study
Bulletin of the International Bureau of Education
Bulletin of the Los Angeles Neurological Society
Bulletin of the Menninger Clinic
Bulletin of the National Association of Secondary School Principals
Bulletin of the New York Academy of Medicine
Bulletin of the School of Education (Indiana University)
Bulletin of Tokyo Dental College
Business Education Forum
Business Education World
Byulletin' Eksperimental' noi Biologii i Meditsiny

PUBLICATIONS SCANNED

CTA (California Teachers Association) Journal
Cahiers de Psychologie
Cahiers de Sociologie Economique
California Education
California Elementary School Administrators Association Monographs
California Journal of Educational Research
California Mental Health Research Digest
California Medicine
California School Boards
California School Employee
California School Libraries
Canada's Mental Health
Canada's Mental Health Supplement
Canadian Administrator
Canadian Anaesthetists' Society Journal
Canadian Audio Visual Review
Canadian Education and Research Digest
Canadian Journal of Behavioural Science
Canadian Journal of Biochemistry
Canadian Journal of Corrections
Canadian Journal of Physiology and Pharmacology
Canadian Journal of Psychology
Canadian Journal of Surgery
Canadian Journal of Theology
Canadian Medical Association Journal
Canadian Nurse
Canadian Psychiatric Association Journal
Canadian Psychologist
Canadian Review of Sociology and Anthropology
Canadian School Journal
Canadian Welfare
Cancer
Cancer Research
Cardiovascular Research
Case Conference
Casopis Lekaru Ceskych
Catholic Charities Review
Catholic Educational Review
Catholic Educator
Catholic High School Quarterly
Catholic Psychological Record
Catholic School Journal
Central Missouri Synthesis on Mental Retardation
Centro Ricerche Biopsichiche
Cerebral Palsy Journal
Ceskoslovenska Psychiatrie
Ceskoslovenska Psychologie
Challenge
Challenge (Kentucky)
Changing Education
Character Potential
Cheshire Smile
Child and Family
Child Development
Child Development Abstracts and Bibliography
Child Development Monographs
Child Education
Child Health in Israel
Childhood Education
Children
Children Limited
Children's House
Child Study
Child Study Center Bulletin (State University Coll. New York, Buffalo)
Child Welfare
Chile Instituto Nacional Boletin
Chirurg
Christianity and Crisis
Christianity Today
Christian Scholar
Church Teacher
Circulation
Circulation Research
Claremont Reading Conference Yearbook
Classical Journal
Clearing House
Clearing House Journal
Clergy Review
Clinica Chimica Acta
Clinical and Experimental Immunology
Clinical Chemistry
Clinical Pediatrics
Clinical Pharmacology and Therapeutics
Clinical Proceedings of Children's Hospital of the District of Columbia
Clover Leaves-Observer
College and University
College English
College of Education Record
College Student Survey
Colorado Education Review
Color Engineering
Commentary
Community Health
Community Mental Health Journal
Comparative Education (Oxford)
Comparative Education Review
Comprehensive Psychiatry
Concordia Historical Institute Quarterly
Conditional Reflex
Conference Board Record
Conference on Reading (University of Chicago)
Confina Neurologica
Confina Psychiatrica
Connecticut Health Bulletin
Connecticut Teacher
Contemporary Education
Contemporary Psychoanalysis
Contemporary Psychology
Contributi dell'Instituto di Psicologia
Cornell Journal of Social Relations
Corrective Psychiatry and Journal of Social Therapy
Cortex
Council for Research in Music Education
Counselor Education and Supervision
Courrier
Crime and Delinquency
Culture and Education
Current Anthropology
Current Contents: Behavioral, Social & Management Sciences
Current Contents: Education
Current Contents: Life Sciences
Current Therapeutic Research
Curriculum and Materials
Curriculum Bulletin
Curriculum Leadership
Curriculum Report
Cybernetica
Cytogenetics

DSH (Deafness, Speech and Hearing) Abstracts
Daedalus
Dapim Refuiim
Defence Science Journal
Deficience Mentale/Mental Retardation
Delaware Association for Retarded Children—News
Delaware School Journal
Der Landarzt
Deutsche Medizinische Wochenschrift
Deutsches Aerzteblatt
Deutsche Zeitschrift fur Nervenheilkunde
Developmental Medicine and Child Neurology
Developmental Psychology
Diabetes
Diabetologia
Diagnostica: Zeitschrift fur Psychologische Diagnostik
Didakometry
Die Medizinishe
Die Rehabilitation
Difesa Sociale
Digest of the Mentally Retarded
Diseases of the Chest
Diseases of the Colon and Rectum
Diseases of the Nervous System
Dissertation Abstracts
Doklady Akademii Nauk SSSR
Doshkol' noe Vospitanie

ERIC (Educational Resources Information Center) Research in Education
ETC: A Review of General Semantics
ETV Reporter
Economic Development and Cultural Change
Education (London)
Education (USA)
Education Age

Educational Administration Quarterly
Educational and Psychological Interactions
Educational and Psychological Measurement
Educational Bulletin (Iowa)
Educational Development
Educational Forum
Educational Horizons
Educational Leadership
Educational Magazine
Educational Perspectives
Educational Psychologist
Educational Psychology
Educational Record
Educational Record of Province of Quebec
Educational Records Bureau Bulletins
Educational Research (British)
Educational Researcher
Educational Review
Educational Sciences
Educational Screen AV (Audio-Visual) Guide
Educational Technology
Educational Television
Educational Theatre Journal
Educational Theory
Educational Times
Education and Culture
Education and Psychology Review
Education and Training of the Mentally Retarded
Education Canada
Education Digest
Education Index
Education in France
Education Panorama
Education Quarterly
Education Review
Education Today
Educato Italiano
Educators Guide to Media and Methods
Ek'sperimental ev Klinikakan Bzhshkowt'yan Handes
Electroencephalography and Clinical Neurophysiology
Elementary English
Elementary School Guidance and Counseling
Elementary School Journal
Employment Service Review
Encephale
Encounter
Endocrinology
Enfance
English in Education
English Journal
English Language Teaching
Environment
Environmental Research
Epilepsia
Ergonomics
Erziehung und Unterricht
European Neurology
Evangelische Theologie, Germany
Evolution Psychiatrique
Exceptional Child Education Abstracts
Exceptional Children
Excerpta Criminologica
Experientia
Experimental Gerontology
Experimental Neurology
Explorations in Entrepreneurial History
Expository Times
Eye, Ear, Nose and Throat Monthly

Family Care Newsletter
Family Law Quarterly
Family Life Coordinator
Family Process
Farmakologiya i Toksikologiya
Federation Proceedings
Fertility and Sterility
Film Quarterly
Fiziologicheskii Zhurnal SSSR
Florida Education
Florida Health Notes
Focus on Exceptional Children
Folia Psychiatrica et Neurologica Japonica
Forecast for Home Economics
Fortschritte auf dem Gebiete der Rotgenstrahlen und der Nuklearmedizin
Forum
Forum for the Discussion of New Trends in Education
Forward Trends
Foundations
France Medicale
Free University Quarterly, Holland
French Review

GAP (Group for the Advancement of Psychiatry) Report
Gastroenterology
Gastrointestinal Endoscopy
Gawein
Geburtshilfe und Frauenheilkunde
General Practice
Genetic Psychology Monographs
Genetika
Georgia Educational Journal
Geriatrics
German Medical Monthly
German Quarterly
Gerontologia
Gerontologia Clinica
Gerontologist
Gifted Child Quarterly
Gordon Review
Grade Teacher
Graduate Research in Education and Related Disciplines
Group Psychotherapy
Guidance Journal
Gynaecologia
Gynakologe

Hachinuch
Harefuah
Harpers Magazine
Harvard Educational Review
Harvard Theological Review
Headache
Head Teachers Review
Health, Education and Welfare Indicators
Health Education Journal
Health Laboratory Science
Heilpadagogische Forschung
Heilpadagogische Werkblatter
Helping Services Forum
Helvetica Paediatrica Acta
Hereditas
Hibbert Journal
High Points
High School Journal
Hispania
Hispanic Review
History of Education Quarterly
History of Religions
Hjertebladet
Homiletic and Pastoral Review
Hommes et Techniques
Hospital (Rio de Janiero)
Hospital and Community Psychiatry
Hospital Management
Hospital Practice
Hospital Progress
Hospitals
Human Biology: An International Record of Research
Human Development
Human Factors
Humangenetik
Human Heredity
Humanitas (Brescia)
Human Organization
Human Potential
Human Relations
HumRRO Professional Paper
HumRRO Technical Report
Hygiene Mentale

IAPPW Journal—International Association of Pupil Personnel Workers

ICRH (Information Center, Recreation for the Handicapped) Newsletter
IEEE (Institute of Electrical and Electronics Engineers) Transactions on Education
IEEE (Institute of Electrical and Electronics Engineers) Transactions on Human Factors in Electronics
IMRID (Institute on Mental Retardation and Intellectual Development) Papers and Reports
Illinois Education
Illinois Journal of Education
Illinois Medical Journal
Illinois School Research
Illinois Schools Journal
Illinois State University Journal
Immunology
Impact of Science on Society
Improving College and University Teaching
Independent School Bulletin
Indiana Teacher
Indiana University School of Education Bulletin
Indian Education
Indian Educational Review
Indian Journal of Educational Administration and Research
Indian Journal of Extension Education
Indian Journal of Mental Retardation
Indian Journal of Psychology
Indian Journal of Social Work
Indian Journal of Theology
Indian Mental Retardation Digest
Indian Psychological Review
Individual Psychologist
Industrial Arts and Vocational Education/Technical Education
Industrial Relations
Information Psychologique
Inquiry
Insight: Quarterly Review of Religion and Mental Health
Institute for Educational Innovation Bulletin
Institute of Dream Research Monograph Series
Instructor
Instructor Magazine
Instrumentalist
Integrated Education
Intellectually Handicapped Child
International Archives of Allergy and Applied Immunology
International Bureau of Education Bulletin
International Child Welfare Review
Internationales Archiv fur Gewerbepathologie und Gewerbehygiene
International Journal for the Education of the Blind
International Journal of Clinical and Experimental Hypnosis
International Journal of Fertility
International Journal of Group Psychotherapy
International Journal of Neuropharmacology
International Journal of Neuropsychiatry
International Journal of Nursing Studies
International Journal of Offender Therapy
International Journal of Parapsychology
International Journal of Psychiatry
International Journal of Psycho-Analysis
International Journal of Psychology
International Journal of Radiation Biology
International Journal of Social Psychiatry
International Journal of Sociometry and Sociatry
International Nursing Review
International Pharmacopsychiatry
International Rehabilitation Review
International Review of Community Development
International Review of Education
International Review of Missions
International Social Sciences Journal
International Social Security Review
International Social Work
International Yearbook of Education
Irish Journal of Medical Science
Israel Annals of Psychiatry and Related Disciplines
Israel Annals of Psychology and Related Disciplines
Israel Journal of Medical Sciences
Italian Studies
Italica
Japanese Journal of Child Psychiatry
Japanese Journal of Educational Psychology
Japanese Journal of Experimental Medicine
Japanese Journal of Human Genetics
Japanese Journal of Medical Science and Biology
Japanese Journal of Pharmacology
Japanese Psychological Research
Jewish Education
Jewish Parent
Jewish Social Studies
Johns Hopkins Medical Journal
Journal de Chirurgie
Journal de Physiologie
Journal de Psychologie Normale et Pathologique
Journal for Social Research
Journal for Special Educators of The Mentally Retarded
Journal for the Scientific Study of Religion
Journalism Quarterly
Journal of Abnormal Psychology
Journal of Aesthetic Education
Journal of Aesthetics and Art Criticism
Journal of Air Pollution Control Association
Journal of Allergy
Journal of American Indian Education
Journal of Analytical Psychology
Journal of Applied Behavioral Science
Journal of Applied Behavior Analysis
Journal of Applied Physiology
Journal of Applied Psychology
Journal of Architectural Education
Journal of Arkansas Education
Journal of Association for the Study of Perception
Journal of Asthma Research
Journal of Auditory Research
Journal of Bacteriology
Journal of Biological Psychology
Journal of Biosocial Science
Journal of Bone and Joint Surgery
Journal of Business Education
Journal of Cell Biology
Journal of Chemical Education
Journal of Child Psychology and Psychiatry and Allied Disciplines
Journal of Chronic Diseases
Journal of Church and State
Journal of Clinical Endocrinology
Journal of Clinical Endocrinology and Metabolism
Journal of Clinical Investigation
Journal of Clinical Pharmacology
Journal of Clinical Psychology
Journal of College Placement
Journal of Communication
Journal of Communication Disorders
Journal of Comparative and Physiological Psychology
Journal of Comparative Neurology
Journal of Conflict Resolution
Journal of Consulting and Clinical Psychology
Journal of Contemporary Psychotherapy
Journal of Correctional Education
Journal of Counseling Psychology
Journal of Creative Behavior
Journal of Criminal Law, Criminology and Police Science
Journal of Dentistry for Children
Journal of Ecclesiastical History
Journal of Education (Boston)
Journal of Education (Halifax)
Journal of Educational Administration
Journal of Educational Data Processing
Journal of Educational Measurement
Journal of Educational Psychology
Journal of Educational Research
Journal of Education for Social Work
Journal of Emotional Education
Journal of Employment Counseling
Journal of Endocrinology
Journal of Engineering Psychology
Journal of Environmental Health
Journal of Existentialism
Journal of Experimental Child Psychology
Journal of Experimental Education
Journal of Experimental Medicine
Journal of Experimental Psychology
Journal of Experimental Research in Personality
Journal of Experimental Social Psychology
Journal of Family Welfare

Journal of General Education
Journal of General Psychology
Journal of Genetic Psychology
Journal of Geography
Journal of Gerontology
Journal of Health and Social Behavior
Journal of Health, Physical Education, and Recreation
Journal of Heredity
Journal of Higher Education
Journal of Home Economics
Journal of Human Relations
Journal of Human Resources
Journal of Immunology
Journal of Individual Psychology
Journal of Industrial Arts Education
Journal of Investigative Dermatology
Journal of Jewish Communal Service
Journal of Laboratory and Clinical Medicine
Journal of Laryngology and Otology
Journal of Learning Disabilities
Journal of Lipid Research
Journal of Marriage and the Family
Journal of Mathematical Psychology
Journal of Medical Education
Journal of Medical Genetics
Journal of Medicinal Chemistry
Journal of Mental Deficiency Research
Journal of Mental Subnormality
Journal of Music Therapy
Journal of Negro Education
Journal of Nervous and Mental Disease
Journal of Neurochemistry
Journal of Neurological Sciences
Journal of Neurology, Neurosurgery and Psychiatry
Journal of Neuropathology and Experimental Neurology
Journal of Neurophysiology
Journal of Neurosurgery
Journal of Neuro-Visceral Relations
Journal of Nuclear Medicine
Journal of Nutrition
Journal of Occupational Medicine
Journal of Oral Surgery
Journal of Oral Surgery, Oral Medicine and Oral Pathology
Journal of Parapsychology
Journal of Pastoral Care
Journal of Pathology and Bacteriology
Journal of Pediatrics
Journal of Peridontal Research
Journal of Personality
Journal of Personality and Social Psychology
Journal of Pharmaceutical Sciences
Journal of Pharmacology and Experimental Therapeutics
Journal of Physical Education
Journal of Programmed Instruction
Journal of Projective Techniques and Personality Assessment
Journal of Psychiatric Nursing and Mental Health Services
Journal of Psychiatric Research
Journal of Psychological Researches
Journal of Psychology
Journal of Psychopharmacology
Journal of Psychosomatic Research
Journal of Public Health Dentistry
Journal of Reading
Journal of Rehabilitation
Journal of Rehabilitation in Asia
Journal of Religion and Health
Journal of Research and Development in Education
Journal of Research in Music Education
Journal of School Health
Journal of School Psychology
Journal of Secondary Education
Journal of Social Issues
Journal of Social Psychology
Journal of Social Work Process
Journal of Special Education
Journal of Speech and Hearing Disorders
Journal of Speech and Hearing Research
Journal of State School Systems Development
Journal of Surgical Research
Journal of Teacher Education
Journal of the Academy of Psychologists in Marital Counseling
Journal of the Acoustical Society of America
Journal of the American Academy of Child Psychiatry
Journal of the American Dental Association
Journal of the American Dietetic Association
Journal of the American Geriatrics Society
Journal of the American Institute of Hypnosis
Journal of the American Medical Association
Journal of the American Optometric Association
Journal of the American Physical Therapy Association
Journal of the American Psychoanalytic Association
Journal of the American Society for Psychical Research
Journal of the American Society of Psychosomatic Dentistry and Medicine
Journal of the American Statistical Association
Journal of the College of General Practice
Journal of the Experimental Analysis of Behavior
Journal of the Hillside Hospital
Journal of the History of the Behavioral Sciences
Journal of the Irish Medical Association
Journal of the National Cancer Institute
Journal of the National Medical Association
Journal of the Neurological Sciences
Journal of the New York State School Boards Association
Journal of the Optical Society of America
Journal of the Reading Specialist
Journal of the Scottish Society for Mentally Handicapped Children
Journal of the Society for Psychical Research
Journal of the Wisconsin State Dental Society
Journal of Thoracic and Cardiovascular Surgery
Journal of Thought
Journal of Trauma
Journal of Tropical Pediatrics
Journal of Typographic Research
Journal of Urology
Journal of Verbal Learning and Verbal Behavior
Journal of Virology
Journal of Vocational and Educational Guidance
Judaism
Junior College Journal
Jyvaskyla Studies in Education, Psychology and Social Research

Kansas Schools
Kansas Studies in Education (Kansas U.)
Kansas Teacher
Kappa Delta Pi Record
Kasvatisopillimen Alkakauskija
Kentucky Education News
Kentucky School Journal
Kenya Education Journal
Khirurgiia, Moscow
Kleine Fachbuchreihe (Kuratorium fur Verkehrssicherheit, Vienna)
Klinische Medizin, Vienna
Klinischeskaya Meditsina
Klinische Wochenschrift, Berlin
Kolner Zeitschrift fur Soziologie and Sozialpsychologie
Kulturno-Prosvetitelnaya Rabota
Kwartalnik Pedogogiczny
Kyklos

LTSH Observer (Lynchburg Training School and Hospital)
Laboratory Investigation
Lancet
Language and Speech
Language Learning
Larartidningen
Laryngoscope
Laval Medical, Quebec
Lebenshilfe
Liberal Education
Library Journal
Library Journal and School Library Journal
Library Quarterly
Life Sciences
Linguistics
London Quarterly and Holborn Review

Louisiana Schools
Lumen Vitae, Belgium
Lupta de Clasa, Rumania
Lutheran Quarterly
Lutheran World

Magyar Pszichologiai Szemle
Main Currents in Modern Thought
Malaysian Journal of Education
Manas
Manitoba Journal of Educational Research
Maryland Teacher
Massachusetts Teacher
Mathematics Teacher
Mayo Clinic Proceedings
McGill Journal of Education
Measurement and Evaluation in Guidance
Medecine Infantile
Medical and Biological Illustration
Medical Care
Medical Journal
Medical Journal of Australia
Medical Research Engineering
Medical Social Work (London)
Medical Thoracalis
Medical World News
Medicine
Medizinische Klinik, Munich
Medizinische Welt, Stuttgart
Megamot
Menninger Quarterly
Mennonite Quarterly Review
Mensch und Arbeit
Mens en Onderneming
Mental Health (National Association for Mental Health, London)
Mental Health Digest
Mental Hygiene
Mental Retardation (AAMD)
Mental Retardation (Canadian ARC)
Mental Retardation Abstracts
Mental Retardation in Illinois
Mental Retardation/MR
Merrill-Palmer Quarterly
Metabolism
Metabolism, Clinical and Experimental
Michigan Education Journal
Michigan Journal of Secondary Education
Michigan Quarterly Review
Middle States Association of Colleges and Secondary Schools Proceedings
Milbank Memorial Fund Quarterly
Military Medicine
Mind Over Matter
Minerva
Minerva Medica
Minerva Medical Journal
Minerva Pediatrica, Turin
Minnesota Journal of Education
Minnesota Student Journal
Minnesota Studies in Vocational Rehabilitation
Mississippi Educational Advance
Mississippi Educational Journal
Missouri Journal of Research in Music Education
Modern Hospital
Modern Language Journal
Modern Vocational Trends
Monographies Francaises de Psychologie
Monographs of the Society for Research in Child Development
Montana Education
Monthly Labor Review
Motive
Multivariate Behavioral Research
Multivariate Behavioral Research Monographs
Munchener Medizinische Wochenschrift, Munich
Music Educators Journal
Music Journal
Muslim World
Muzika, Rumania

NCEA (National Catholic Educational Association) Bulletin
NEA (National Education Association) Journal
NEA (National Education Association) Research Bulletin
NEA (National Education Association) Research Report
NIH (National Institutes of Health) Record
Nachal'naya Shkola
National Association of Secondary School Principals Bulletin
National Association of Student Councils Yearbook
National Association of Women Deans and Counselors Journal
National Business Education Quarterly
National Business Education Yearbook
National Council for the Social Studies
National Council of Teachers of Mathematics Yearbook
National Educational TV
National Education Association Addresses and Proceedings
National Elementary Principal
National Institute of Industrial Psychology Paper
National Merit Scholarship Corporation Research Reports
National School Law Reporter
National Society for the Study of Education Yearbook
Nation's Schools
Nature
Nauka i Religiya
Nauka i Zhizn'
Nebraska Symposium on Motivation
Nederlands Tijdschrift voor de Psychologie en haar Grensgebieden
Nederlands Tijdschrift voor Geneeskunde
Negro Educational Review
Nervenarzt
Neue Zeitschrift fur Systematische Theologie
Neurologia, Psihiatria, Neurochirurgia
Neurology
Neuropsichiatria
Neuropsichiatria Infantile (formerly Infanzia Anormale)
New Education (London)
New England Association Review
New England Journal of Medicine
New Outlook for the Blind
New Research in Education
New Scholasticism
Newsletter—Journal of the Scottish Society for Mentally Handicapped Children
Newsletter of Chaplains and Other Religious Workers Subsection AAMD
Newsletter of the International Union for Child Welfare
Newsletter of the National Association for Mental Health
Newsletter of the New Jersey Association for Brain Injured Children
Newsletter of the Tennessee Association for Retarded Children and Adults
Newsletter—The Aid for Retarded Children, Inc. of Stamford, Connecticut
New York City Board of Education Curriculum Bulletins
New York City Education
New York Society for the Experimental Study of Education
New York State Education
New York State Journal of Medicine
New York Times (Education Supplement)
New Zealand Journal of Educational Studies
Ninos
Nordisk Medicin
Nordisk Psykologi
North Carolina ARC News
North Carolina Education
North Central Association Quarterly
North Dakota Teacher
Northeastern Studies in Vocational Rehabilitation
Nos Enfants Inadaptes

Nouvelle Revue Theologique
Nova et Vetera, France
Nursing Mirror
Nursing Outlook
Nursing Research
Nutrition Reviews

Obstetrics and Gynecology
Occupational Mental Health Notes
Occupational Outlook Quarterly
Occupational Psychology
Office
Ohio Schools
Ohio State Medical Journal
Oklahoma Teacher
Ontario Journal of Educational Research
On Your MARC (Massachusetts Association for Retarded Children)
Onze Taak
Operations Research
Ophthalmologica
Oral Surgery, Oral Medicine and Oral Pathology
Oregon Education
Organizational Behavior and Human Performance
Orientamenti Pedagogici
Orvosi Hetilap
Our Children
Our Schools Today

PTA Magazine (Parent Teacher Association)
Pacesetters in Innovation
Pacific Medicine and Surgery
Pacific Sociological Review
Padiatrie und Padologie
Paedagogische Rundschau
Panminerva Medica
Papers in Psychology
Parents Magazine
Parents' Magazine & Better Family Living
Parents' Voice
Parks and Recreation
Past and Present
Pastoral Counselor
Pastoral Psychology
Pathologie et Biologie
Peabody Journal of Education
Pedagogia
Pedagogisk Forskning
Pedagogisk-Psykologisk Problem
Pediatric Clinics of North America
Pediatric Research
Pediatrics
Pediatriya
Pennsylvania Message
Pennsylvania Psychiatric Quarterly
Pennsylvania School Journal
Perception and Psychophysics
Perceptual and Motor Skills
Personnel
Personnel Administration
Personnel and Guidance Journal
Personnel Journal
Personnel Management
Personnel Management Abstracts
Personnel Practice Journal
Personnel Psychology
Perspectives in Biology and Medicine
Pflugers Archive-European Journal of Physiology
Pharmacological Reviews
Pharmakopsychiatrie Neuro-Psychopharmakologie
Phi Delta Kappan
Philosophical Review
Philosophy and Phenomenological Research
Philosophy of Science
Phylon
Physical Education
Physical Educator
Physical Therapy
Physiologia Bohemoslovenica
Physiology and Behavior

Pittsburgh Teachers Bulletin
Plastic and Reconstructive Surgery
Pointer
Polish Endocrinology
Polish Medical Journal
Population et Famille/Bevolking en Gezin
Postgraduate Medical Journal
Postgraduate Medicine
Practical Anthropology
Practica Oto-Rhino-Laryngologica
Praktische Psychologie
Praxis
Praxis der Kinderpsychologie und Kinderpsychiatrie
Praxis der Psychotherapie
Presse Medicale
Presspoints
Primates
Probleme un Ergebnisse der Psychologie
Proceedings of the Annual Convention of the American Psychological Association
Proceedings of the Annual Meeting of the Gerontological Society
Proceedings of the Indiana Academy of Science
Proceedings of the Invitational Conference on Testing Problems
Proceedings of the National Academy of Sciences, U. S.
Proceedings of the Royal Society of Medicine
Proceedings of the Society for Experimental Biology and Medicine
Proceedings of the Society for Psychical Research
Proceedings of the Southwestern Sociological Association
Programmed Instruction Bulletin
Programmed Learning
Programmed Learning and Educational Technology
Programs for the Handicapped
Progress in Cardiovascular Diseases
Progressive Architecture
Progressive Teacher
Project News of the Parsons State Hospital and Training School
Psicologia y Educacion
Psyche, Stuttgart
Psychedelic Review
Psychiatria Clinica
Psychiatria et Neurologia
Psychiatria et Neurologia Japonica
Psychiatria, Neurologia, and Neurochirurgia
Psychiatric Quarterly
Psychiatric Quarterly Supplement
Psychiatric Research Reports
Psychiatrie, Neurologie und Medizinische Psychologie
Psychiatry
Psychoanalytic Quarterly
Psychoanalytic Review
Psychologia Africana
Psychologia Africana Monograph Supplement
Psychologia: An International Journal of Psychology in the Orient
Psychologia a Patapsychologia Dietata
Psychologia Wychowawcza
Psychological Abstracts
Psychological Bulletin
Psychological Issues
Psychological Monographs
Psychological Record
Psychological Reports
Psychological Research Bulletin
Psychological Researches
Psychological Review
Psychologie Francaise
Psychologie und Praxis
Psychologie v Ekonomicke Praxi
Psychologische Beitrage
Psychologische Forschung
Psychologische Praxis
Psychologische Rundschau
Psychology
Psychology in the Schools
Psychology Today
Psychometrika
Psychonomic Monograph Supplement

Psychonomic Science
Psychopharmacologia
Psychopharmacology Bulletin
Psychophysiology
Psychosomatic Medicine
Psychosomatics
Psychosynthesis Research Foundation
Psychotherapy and Psychosomatics
Psychotherapy: Theory, Research and Practice
Psykisk Utvecklings Hamning
Pszichologiai Tanulmanyok
Public Administration
Public Administration Review
Public Health Reports
Public Health Service Publication
Public Interest
Public Opinion Quarterly
Public Personnel Review
Public Welfare
Purdue Opinion Panel Poll Report

Qawwi Qalbek
Quaderni di Neuropsichiatria Infantile (formerly Quaderni di Infanzia Anormale)
Quarterly Journal of Experimental Psychology
Quarterly Journal of Medicine
Quarterly Journal of Speech
Quarterly Journal of Studies on Alcohol

Race
Radiation Research
Radiologia Clinica et Biologica
Radiology
Rajasthan University Studies
Rational Living
Reader's Guide
Reading Improvement
Reading Research Quarterly
Reading Teacher
Record
Recreation for the Handicapped
Recreation in Treatment Centers
Recreator
Reference Report (Washington State Department of Institutions)
Reformed Review
Rehabilitation
Rehabilitation and Health
Rehabilitation Counseling Bulletin
Rehabilitation in Australia
Rehabilitation Literature
Rehabilitation Record
Religion in Life
Religious Education
Remedial Education
Report from the Institute of Education, U. Turku
Reports from the Psychological Institute, U. Helsinki
Reports from the Psychological Laboratory, University of Southern California
Reports of the Institute for Science of Labour, Tokyo
Research Bulletin of the Department of Psychology, Osmania U.
Research Bulletin of the National Institute for Educational Research, Tokyo
Research in Education
Research Project, U. Canterbury
Research Quarterly
Research Quarterly of American Association of Health, Physical Education, and Recreation
Research Reporter
Research Review (Washington State Department of Institutions)
Restoration Quarterly
Review and Expositor
Review of Czechoslovak Medicine
Review of Educational Research
Review of Existential Psychology and Psychiatry
Review of Religious Research
Revista Argentina de Psicologia
Revista Brasileira de Deficiencia Mental
Revista Brasileira de Estudos Padagogicas
Revista de Etnografie si Folclor
Revista del Instituto de Ciencas Sociales
Revista de Neuro-Psiquiatria
Revista de Pedagogie, Rumania
Revista de Psicoanalisis
Revista de Psicologia General y Aplicada
Revista de Psicologia Normal e Patologica
Revista de Psicopatologia, Psicologia Medica y Psicoterapia
Revista de Psihologie
Revista de Psiquiatria y Psicologia Medica
Revista de Statistica
Revista do Instituti Ciencias Sociaes da Universidade do Brasil
Revista Interamericana de Psicologia
Revista Mexicana de Psicologia
Revista Mexicana de Sociologia
Revue de L'Universite d'Ottawa
Revue de Medecine Psychosomatique et de Psychologie Medicale
Revue de Neuropsychiatrie Infantile et d'Hygiene Mentale de l'Enfance
Revue de Psychologie Appliquee
Revue de Psychologie des Peuples
Revue des Ecoles
Revue D'Histoire Ecclesiastique
Revue d'Hygiene et de Medecine Sociale
Revue Francaise de Psychanalyse
Revue Francaise de Sociologie
Revue Internationale de Sociologie
Revue Neurologique
Revue Roumaine des Sciences Sociales: Serie de Psychologie
Ricerca Scientifica
Ridge News, State Home and Training School, Wheat Ridge, Colorado
Rivista Dell'Instuto Seroterapics Italiana
Rivista di Psicologia della Scrittura
Rivista di Psicologia Sociale e Archivio Italiano di Psicologia Generale e del Lavoro
Rocky Mountain Social Science Journal
Romanian Medical Review
Royal Society of Medicine, Proceedings
Rural Sociology
Russkii Yazyk V Natsionalnoi (Shkole)

SK&F Psychiatric Reporter
Safety Education
Sak'art'velos SSR Mets'nierebat'a Akademiis Moambe
Saturday Review
Sbornik Lekarsky
Sbornik Praci Filosoficke' Fakulty Brnenske' University
Scandinavian Journal of Clinical and Laboratory Investigation
Scandinavian Journal of Infectious Diseases
Scandinavian Journal of Psychology
Scandinavian Studies
Scholastic Coach
Scholastic Teacher
School Activities
School Administration
School and Community
School and Society
School Arts
School Boards
School Counselor
School Guidance Worker
School Health Review
School Law Review
School Libraries
School Library Journal
School Lunch Journal
School Management
Schoolmen's Week, University of Pennsylvania
School Musician Director and Teacher
School of Education Bulletin, Indiana University
School Progress
School Review

School Safety
School Science and Mathematics
School Shop
Schule und Psychologie
Schweizer Erziehungs-Rundschau
Schweizerische Medizinische Wochenschrift
Schweizer Zeitschrift fur Psychologie
Science
Science and Society
Science Digest
Science Education
Science Journal
Science News
Sciences
Sciences Ecclesiastiques, Belgium
Science Teacher
Scientia Paedogogica Experimentalis
Scientific American
Scottish Educational Studies
Scottish Education Journal
Scottish Medical Journal
Securitas
Semaine des Hopitaux
Seminars in Psychiatry
Sight-Saving Review
Slow Learning Child
Smith College Studies in Social Work
Social and Clinical Psychology
Social Biology (formerly Eugenics Quarterly)
Social Casework
Social Education
Social Forces
Social Health News
Social Problems
Social Psychiatry
Social Research
Social Science
Social Science and Medicine
Social Science Information
Social Science Quarterly
Social Security Bulletin
Social Service Review
Social Studies
Social Work
Social Worker-Travailleur Social
Sociologia, Brazil
Sociological Abstracts
Sociological Bulletin
Sociological Inquiry
Sociological Quarterly
Sociological Review
Sociologicky Casopis
Sociology
Sociology and Social Research
Sociology of Education
Sociometry
Sotsiologiia VSSR,
South African Medical Journal
Southern Education Report
Southern Medical Bulletin
Southern Medical Journal
Southern Quarterly
Southwestern Journal of Anthropology
Southwestern Journal of Theology
Sovetskaya Meditsina
Sovetskaya Pedagogika
Soviet Education
Soviet Neurology and Psychiatry
Soviet Psychology
Soviet Review
Soviet Sociology
Sovremennye Problemy Deyatel'nosti i Stroeniya Tsentral'noi Nervnoi Sistemy
Sozial Welt, Germany
Special Education
Special Education in Canada
Special Education Review
Spectrum
Speech Monographs
Speech Teacher
Staff
Steaua, Rumania
Steroids
Studia Psychologica
Studi e Richerche di Psicologia
Studies and Research
Studies in Art Education
Studies in Higher Education
Studies on the Left
Surgery
Surgery, Gynecology and Obstetrics
Surgical Clinics of North America

TR Times
Tarbiz, Israel
Teacher
Teachers College Journal
Teachers College Record
Teaching Aids News
Teaching and Training
Teaching Exceptional Children
Technical Bulletin of the Registry of Medical Technologists
Techniques
Tennessee Teacher
Teoriija i Praktika Fizicheskoi Kulitury
Teratology
Texas Medicine
Texas Outlook
Texas Reports on Biology and Medicine
Theology and Life
Theology Today
Theoria: A Swedish Journal of Philosophy
Theory into Practice
Therapeutic Recreation Journal
Think
Thorax
Tidsskrift for den Norske Laegeforening, Oslo
Tijdschrift voor Geneeskunde, Louvain
Tijdschrift voor Zwakzinnigheid en Zwakinnigenzorg
Times Educational Supplement, London
Todays Child
Today's Education
Tohoku Journal of Experimental Medicine
Tohoku Psychologica Folia
Toronto Education Quarterly
Traffic Safety Research Review
Training School Bulletin
Traite' de Psychologie Experimentale
Trans-Action
Transactions of the New York Academy of Sciences
Transactions of the Westermarck Society
Transfusion
Transplantation
Travail Humain
Trends in Education
Trudy Leningradskogo Nauchno-Issledovatel' skogo Instituta Ekspertizy Trudosposobnosti i Organizatsii Truda Invalidov

UNESCO Courier (United Nations Educational, Scientific and Cultural Organization)
Ugeskrift fur Laeger, Copenhagen
Union Medicale du Canada
United States Office of Education Publications
Universities Quarterly
Urban Education
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Urban Review
Urban Studies
Urim
Utah Educational Review

V.O.C. Journal of Education
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Vestnik Oftalmologii, Moscow
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Viata Romineasca
Victoria University of Wellington Publications in Psychology
Virginia Journal of Education
Virology

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Visual Education
Vocational Guidance Quarterly
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Volta Review
Volunteer Council News (Lynchburg Training School and Hospital)
Voprosy Filosofii
Voprosy Psikhologii
Voprosy Sravnitel'noi Fiziologii Analizatorov
Vox Sanguinis
Vrachebnoe Delo, Kiev

WHO (World Health Organization) Bulletin
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Warren G. Murray Children's Center (State of Illinois Department of Mental Health)
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Welfare in Review
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Welt der Schule
Wesleyan Studies in Religion
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Wilson Library Bulletin
Winnower
Wisconsin Journal of Education
Works of the Institute of Higher Nervous Activity: Pathophysiological Series
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Yale Journal of Biology and Medicine
Young Children

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Zeitschrift Fuer Kirchengeschichte
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Zeitschrift fur die Gesamte Innere Medizin und Ihre Grenzgebiete
Zeitschrift fur Experimentelle und Angewandte Psychologie
Zeitschrift fur Heilpadagogik
Zeitschrift fur Kinderheilkund, Berlin
Zeitschrift fur Paedagogik
Zeitschrift fur Psychologie
Zeitschrift fur Psychosomatische Medizin un Psychoanalyse
Zeitschrift fur Psychotherapie und Medizinische Psychologie
Zeitschrift fur Theologie und Kirche
Zeitschrift fur Tierpsychologie
Zeitschrift Orthopaedie und Ihre Grenzgebiete
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Zeszyty Naukow
Zhurnal Nevropatologii i Psikhiatrii
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Zhurnal Vysshei Nervnoi Deyatelnosti
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Abbreviations:

b.i.	brain injury, brain injured
CNS	central nervous system
CP	cerebral palsy
c/w	compared with
EMR	educable mentally retarded
ep.	epilepsy
fr	from
inst.	institution, institutionalized
MR	mentally retarded
PMR	profoundly mentally retarded
SMR	severely mentally retarded
spec. ed.	special education
TMR	trainable mentally retarded
w/	with

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